# GROUNDWATER INVESTIGATION STACK PROPERTY NORTH CHICAGO, ILLINOIS

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Geraghty & Miller, Inc. is submitting this report to the Northern Trust Company for work performed at the Stack Property site in North Chicago, Illinois. The report was prepared in conformance with Geraghty & Miller's strict quality assurance/quality control procedures so that the report meets current industry standards in terms of the methods used and the information presented. If you have any questions or comments concerning this report, please contact one of the individuals listed below.

Respectfully submitted,

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# **CONTENTS**

			Page
1.0	INTR	ODUCTION	1-1
	1.1	SITE BACKGROUND	1-1
		1.1.1 Site Description	
	1.2	PURPOSE AND SCOPE OF INVESTIGATION	1-3
2.0	INVE	STIGATION METHODS	2-1
	2.2 2.3 2.4 2.5 2.6	MONITORING WELL INSTALLATION  MONITORING WELL DEVELOPMENT  GROUNDWATER LEVEL MEASUREMENTS  GROUNDWATER SAMPLING AND ANALYSIS  DECONTAMINATION  SURVEYING  DATA VALIDATION	2-2 2-2 2-2 2-3 2-3
3.0	INVE	STIGATION RESULTS AND DISCUSSION	3-1
	3.1	GEOLOGY	3-1
		3.1.1 Regional Geology	
	3.2	HYDROGEOLOGY	3-4
		3.2.1 Regional Hydrogeology	
	3.3	GROUNDWATER QUALITY	3-5
		3.3.1 Volatile Organic Compounds	

# **CONTENTS** continued

4.0	SUMMARY AND CONCLUSIONS	ige 4-1
	4.1 SUMMARY OF FINDINGS	<b>1-1</b>
	4.1.1 Geology	<b>1-2</b>
	4.2 CONCLUSIONS	1-3
	4.2.1 Geology       4         4.2.2 Hydrogeology       4         4.2.3 Groundwater Quality       4	1-4 1-4
5.0	REFERENCES	5-1
	<u>TABLES</u>	
2-1 2-2 3-1 3-2	Groundwater Elevations Target Analyte List Summary of Groundwater Analytical Results - Detected Volatile Organic Compoun Summary of Groundwater Analytical Results - Detected Metals	ıds
	<u>FIGURES</u>	
1-1 1-2 2-1 3-1 3-2 3-3	Site Location Map Site Layout Monitoring Well and Cross-Section Location Map Hydrogeologic Cross-Section A-A' Hydrogeologic Cross-Section B-B' Water Table Elevation Contour Map	
	APPENDICES	
A.	Monitoring Well and Soil Boring Logs.  Data Validation and Laboratory Groundwater Analytical Results	

# GROUNDWATER INVESTIGATION STACK PROPERTY NORTH CHICAGO, ILLINOIS

### 1.0 INTRODUCTION

Geraghty & Miller, Inc. (Geraghty & Miller) has prepared this report to describe the investigations conducted in November 1993 on behalf of the Northern Trust Company (Northern Trust) at the Stack Property located in the 1100 block of 22nd Street in North Chicago, Lake County, Illinois. A groundwater investigation was conducted at the Stack Property to confirm and expand upon earlier studies conducted at the property.

The investigations conducted at the site are preliminary in nature and have been conducted as initial site investigation activity consistent with the National Oil and Hazardous Substances Contingency Plan (Federal Register, March 8, 1990). The site investigation work performed is in substantial compliance with the Interim Final Guidance for Performing Site Inspections Under CERCLA (September 1992). It must be noted that the work done does not constitute a completed site inspection, but rather initial steps in the site inspection process.

#### 1.1 SITE BACKGROUND

Background information on the Stack Property has been summarized in the following sections from reports prepared by MAECORP, Inc., (October 9, 1988; March 27, 1989; and February 10, 1989), a Preliminary Assessment form prepared by the Illinois Environmental Protection Agency (IEPA 1990), and IEPA's unconfirmed analytical results (Fetzner, pers. comm. 1993). Information on a neighboring property (Fansteel, Inc.) has been summarized from a Preliminary Assessment report (IEPA 1991) and correspondence concerning a RCRA closure (Steger, pers. comm., 1990; Carlson, pers. comm., 1991; Carlson, pers. comm., 1993).

### 1.1.1 Site Description

The Stack Property is located on the northeast corner of Commonwealth Avenue and 22nd Street in a primarily industrial area of North Chicago. The property is bounded to the north by the Elgin-Joliet Eastern Railroad tracks, with residentially developed districts north of the tracks (Figures 1-1 and 1-2). To the east of the site is Fansteel, Inc., a manufacturer of the munitions component, tantalum (IEPA 1991) and other non-ferrous metal products. The Stack Property is currently a vacant lot with Pettibone Creek flowing from north to south along the west-central area of the site, and a gravel road in the east-central area of the site that accesses 22nd Street (Martin Luther King Jr. Drive). Pettibone Creek discharges to Lake Michigan approximately 1 mile south and east of the site. A culvert, approximately 36 inches in diameter, enters Pettibone Creek from the west side, appearing to originate from the direction of the EMCO facility to the west.

To the east of Pettibone Creek several low piles of a dark, sand-size granular material are present. This material and dozens of ruptured 5-gallon plastic containers, as well as general trash and construction debris, are found both east and west of the creek. During the monitoring well installation and sampling activities, a strong solvent odor coming from the direction of the EMCO facility, a chemical distributor, to the west of the Stack Property was periodically noted by the Geraghty & Miller geologist.

### 1.1.2 Site History

Two incidents occurred at the Stack Property which ultimately led to a Preliminary Assessment being conducted at the site by the IEPA in February 1990. The first incident was a fire which occurred at the site in June 1988. The fire was contained by the North Chicago fire department. Illegal waste dumping was considered the possible cause of the fire. The second incident was the discharge of a discolored liquid from the culvert into Pettibone Creek.

Relative to the second incident, MAECORP, Inc., in October 1988, at the request of the Northern Trust, collected a sample of the discolored liquid that was ponded in the stream bed of Pettibone Creek at the discharge point of the culvert. The analytical results indicated that both metals and volatile organic compounds (VOCs) were present in the discolored liquid.

Additional site characterization work, authorized by The Northern Trust in January 1989, included installation of four soil borings, three of which were completed as monitoring wells (MW-1, MW-2, and MW-3) (MAECORP, 1989a and 1989b). Soil and groundwater samples were also collected and submitted for laboratory analysis. The soil samples indicated the presence primarily of metals, but also two VOCs, methylene chloride and toluene. The groundwater samples indicated the presence of metals.

Additional soil, stream sediment and groundwater samples were collected in May of 1993 by Mostardi-Platt Associates, Inc. for the IEPA (Fetzner, pers. comm., 1993). Relative to groundwater, the IEPA data indicated the presence of several chlorinated VOCs at one monitoring well (MW-3) including vinyl chloride at a concentration greater than two milligrams per liter [(mg/L) or parts per million (ppm)]. No significant metals impacts to groundwater were indicated by the IEPA data. The soil and stream sample data indicated compounds belonging to several classes of organic chemicals were present including VOCs and semivolatile organic compounds (SVOCs), and to a lesser degree pesticides and polychlorinated biphenyls (PCBs). Concentrations of several metals such as boron, copper, lead, and zinc were elevated above background in several on-site soil and stream sediment samples.

#### 1.2 PURPOSE AND SCOPE OF INVESTIGATION

The November 1993 groundwater investigation was conducted to evaluate the quality of shallow groundwater at different locations of the site, the flow direction of shallow groundwater, and the potential for impacts to shallow groundwater from off-site sources.

Several site investigation tasks were performed to meet the project objectives. Three soil borings were installed at the Stack Property and core samples of the subsurface materials were observed and described. The borings were completed as monitoring wells, constructed to intercept the water table. These new monitoring wells (GMMW-1, GMMW-2, GMMW-3) and two previously existing wells (MW-1, MW-3) were sampled for analysis of metals and VOCs to evaluate groundwater quality conditions. Static groundwater level measurements were also made at each of the five monitoring wells sampled to determine groundwater flow direction and gradient. In addition, the locations and elevations of monitoring wells and other site features were determined by surveying so that spatial relationships were characterized.

Literature review included review of previous reports of site investigations at the Stack property and documents related to closure of Fansteel's Resource Conservation And Recovery Act (RCRA) hazardous waste management unit. The above reports and documents were supplied to Geraghty & Miller by Northern Trust. Geraghty & Miller also reviewed published geologic and hydrogeologic literature pertinent to the study area.

### 2.0 **INVESTIGATION METHODS**

Work performed by Geraghty & Miller is described and documented in this section. The discussion includes rationale and details of the methods and procedures utilized.

#### 2.1 MONITORING WELL INSTALLATION

Three soil borings, GMMW-1 through GMMW-3, were drilled at the Stack Property for the purpose of recording the subsurface materials and to install monitoring wells (Figure 2-1). The locations of the monitoring wells (GMMW-1 through GMMW-3) were designed to determine groundwater flow direction and initially appraise any impacts to groundwater from offsite sources.

The well installation was conducted by Rock & Soil Drilling Corporation of St. Charles, Illinois on November 19, 1993 under the supervision of a Geraghty & Miller geologist. The borings were advanced with a truck-mounted drill rig using 4.25-inch inner diameter hollow-stem augers. Soil samples were collected for visual observation with a 2-inch diameter split spoon sampler driven by an automatic hydraulic hammer attached to the drill rig. Split spoon samples were collected on a continuous basis from the ground surface to the terminus of the borings. Logs of the soil borings are included in Appendix A.

Monitoring Wells GMMW-1, GMMW-2, GMMW-3 were installed in the three soil borings drilled at the site. The monitoring wells were constructed of 2-inch diameter, flush joint, threaded Schedule 40 polyvinyl chloride (PVC) riser and a 10-foot PVC well screen with 0.010-inch slots. The monitoring wells were installed with the screens set 7 feet (ft) into the interpreted depth of the water table. The well screen and riser were certified clean by the manufacturer, and removed directly from the plastic packaging just before installation. The annular space around the well screens was backfilled with a medium-grain quartz sand filter pack from the base of the well to approximately 1 to 3 ft above the top of the well screen. Approximately 2 ft of a bentonite pellet seal, hydrated with distilled water, was placed above the sandpack. Granular bentonite was placed above the bentonite seal to within

approximately 2 ft of the ground surface. A concrete surface seal and steel protective casing were installed at the top of the well, with a stickup of approximately 2 ft.

#### 2.2 MONITORING WELL DEVELOPMENT

The monitoring wells were developed using dedicated PVC bailers attached to nylon rope. A minimum of ten well-volumes of groundwater was removed from each of the wells. The development water was placed in 55-gallon drums and placed near Monitoring Wells GMMW-1 and GMMW-2.

#### 2.3 GROUNDWATER LEVEL MEASUREMENTS

The depth to groundwater was measured in each of the monitoring wells using an electric level indicator. The static water levels were measured on November 29, 1993, recorded in the field notebook, and are summarized in Table 2-1.

#### 2.4 GROUNDWATER SAMPLING AND ANALYSIS

Samples of groundwater were collected from Monitoring Wells MW-1, MW-2, GMMW-1, GMMW-2, and GMMW-3 on November 29, 1993. The monitoring wells were purged of a minimum of three well-volumes prior to sample collection using the dedicated bailers. For quality control purposes, a duplicate sample was collected from GMMW-3 and submitted blindly to the laboratory as "GMMW-4." Matrix spike and matrix spike duplicate samples were collected from Monitoring Well GMMW-2. In addition, a field equipment reinstate sample was collected by pouring distilled water through an unused bailer and collecting the reinstate in sample containers to verify that the sampling equipment did not contain any contaminants of concern.

The samples collected for analysis of VOCs were placed in containers preserved with hydrochloric acid. Samples collected for analysis of Target Analyte List (TAL) metals were

filtered in the field with a 0.045µm filtering device and placed in containers preserved with nitric acid. A list of the TAL parameters is presented in Table 2-2. The sample containers were placed in a cooler at 4°C and shipped following appropriate chain-of-custody protocols to Heritage Laboratories, Inc. in Indianapolis, Indiana via express mail. The samples submitted for analysis of VOCs were analyzed by USEPA Method 8240 (USEPA, 1986). The samples submitted for analysis of TAL metals were analyzed by USEPA Methods 6010A, 7060, 7841, 7740, and 7470, as appropriate (USEPA, 1986).

### 2.5 DECONTAMINATION

The hollow-stem auger flights used to drill the soil borings were steam-cleaned between boring locations. Split-spoon samplers used to collect soil samples for visual observation were decontaminated before they were used by an Alconcox and water wash followed by a potable water rinse.

#### 2.6 SURVEYING

The existing monitoring wells and the wells installed by Geraghty & Miller were surveyed by Beling Consultants of Joliet, Illinois on November 29, 1993 for vertical elevation and horizontal location. In addition, site boundaries and features such as Pettibone Creek were also surveyed.

#### 2.7 DATA VALIDATION

The analytical results of samples collected during the investigation were validated by Geraghty & Miller. The analytical data were evaluated against criteria established in USEPA guidance documents (USEPA 1988a and 1988b). The goal of data validation is to verify the integrity of the data so that it can be used to assess site conditions and identify any environmental impacts. A data validation summary report is included with the laboratory report in Appendix B.

### 3.0 INVESTIGATION RESULTS AND DISCUSSION

Investigation results including a summary of geologic and hydrogeologic literature reviewed is presented and discussed in this section. The discussion of the regional geology and hydrogeology focuses on describing strata and groundwater resources from ground surface down to and including the first regional aquitard hydraulically separating shallow and deep aquifer systems. Presentation and discussion of groundwater quality results from November 1993 conclude this section.

#### 3.1 GEOLOGY

Geologic information is presented first on a regional basis from review of published literature. This is followed by results of site investigation work performed on the Stack Property and adjacent Fansteel property to provide the site specific geologic information.

### 3.1.1 Regional Geology

Regional geologic information indicates that unconsolidated deposits in the shallow subsurface in the vicinity of the site consist of glacial lake deposits and glacial till (Willman and Lineback 1970). The shallow subsurface soil at the site is part of an area mapped by Willman and Lineback (1970) as lake plain with local thin deposits of silt, clay, and sand of the Equality Formation. Lake plain areas consist of deposits from the floors of glacial lakes flattened by wave erosion and by minor deposition in low areas. These areas are largely underlain by glacial till.

The Equality Formation, common in patches throughout areas mapped as lake plain, is composed of silt, sand, gravel, and clay deposits. This formation is subdivided into two members: the Carmi Member and the Dolton Member. The Carmi Member is predominantly silt and clay while the Dolton Member is predominantly sand and gravel. In most of the lake basins, the Carmi Member deposits are only a few feet thick and rarely as much as 20 ft

thick. The Dolton Member deposits are generally less than 10 ft thick, but in some of the more prominent spits (deposits of sand or gravel projecting from a shore into a body of water) they are as thick as 25 feet (Willman 1971).

Underlying the Equality Formation at the site and at the surface to the east and west is the Wadsworth Till Member of the Wedron Formation (Willman and Lineback 1970). The Wadsworth Till Member consists predominantly of a gray clayey till containing local lenses of silt, sand, and gravel. The deposits are generally 50 to 100 ft thick, but in some of the more prominent moraines they are as thick as 300 ft.

According to Willman (1971), the bedrock immediately below the glacial deposits in the North Chicago area is the Niagaran Series Racine Dolomite. The Racine Dolomite is the uppermost Silurian formation and has a maximum thickness of about 300 ft. The Racine Formation is characterized by the presence of large reefs surrounded by argillaceous and silty dolomite with local lenses of green shale. The dolomite associated with the reefs is medium gray and vuggy. The inter-reef rock is typically light brownish gray, fine-grained, dense, and cherty dolomite. Based on well records from the Illinois State Geological Survey and the Illinois State Water Survey for water wells located in the North Chicago area, the Silurian dolomite is present at a depth of 130 to 160 ft below ground surface (bgs) with a thickness ranging from 225 to 350 ft.

Below the dolomite are the Ordovician-aged rocks of the Maquoketa Group Shale, which is the regional aquitard separating the upper Silurian dolomite aquifer from the Cambrian-Ordovician Aquifer lying below the shale. The Cambrian Ordovician Aquifer consists (in downward order) of the Ordovician-aged Galena-Platteville Dolomite and the Glenwood-St. Peter Sandstone and the Cambrian-aged Eminence-Potosi Dolomite, Franconia Formation, and Ironton-Galesville Sandstone.

### 3.1.2 Site Geology

The site geology is based on drilling logs for six monitoring wells located on the site property. For Geraghty & Miller borings, the soil sample descriptions are documented on Sample/Core Logs included in Appendix A. The site geology is illustrated in cross sections presented as Figures 3-1 and 3-2. The location of each cross section is shown on Figure 2-1. In general, the unconsolidated deposits at the site consist 1.5 to 5 ft of black sand fill underlain by 2 to 4.5 ft of tan to gray sandy silt unit (silt unit) followed by grayish silty clay unit (clay unit) to the terminus of each boring at 10.5 to 20 ft bgs. In addition, laterally discontinuous silty to gravelly sand deposits were encountered just above or within the silt unit, particularly in the northern portion of the site. The black sand fill was not present west of Pettibone Creek at Monitoring Well GMMW-3, where sandy silt was present at the surface to a depth of about 7 ft bgs.

A review of cross sections prepared by Carlson Environmental, Inc. (Carlson, pers, comm., 1993) profiling the geology at the Fansteel property, indicates that there is a silt unit with interbedded sand, gravel, and sandy clay from ground surface to a depth ranging from approximately 11 to 25 ft bgs. The cross sections lack detail and do not indicate the thickness or extent of the sand and gravel zones within the silt. With the exception of one boring (B-6), the cross sections indicate a gray silty clay unit lying below the silt unit to a depth of at least 40 ft bgs. Thin (less than 0.5 ft) sand and gravel seams are shown throughout the clay unit. Soil Boring B-6 contains a medium to coarse grained sand below the silt from a depth of about 25 to 38 ft bgs. The cross section indicates that this sand seam is not continuous throughout the property. With the possible exception of the upper silt unit, there does not appear to be laterally continuous permeable zones (sand or gravel) on the Fansteel property down to a depth of 40 ft bgs.

#### 3.2 HYDROGEOLOGY

Hydrogeologic information is presented first on a regional basis from review of published literature. This is followed by results of site investigation work performed on the Stack Property and adjacent Fansteel property to provide the site specific hydrogeologic information.

### 3.2.1 Regional Hydrogeology

According to Woller and Gibb (1976), four aquifers in Lake County are used as a water source. The aquifers from shallow to deep include sand and gravel deposits in the unconsolidated materials above bedrock, the Shallow Dolomite Aquifer consisting mostly of the Silurian dolomite, the Cambrian-Ordovician Aquifer, and the Elmhurst-Mt. Simon Aquifer. The Ironton-Galesville and Glenwood-St.Peter Sandstones are the most productive units of the Cambrian-Ordovician Aquifer. The Elmhurst-Mt.Simon Aquifer consists of the Mt. Simon Sandstone and the basal sandstone of the Eau Claire Formation.

The shallow aquifers (unconsolidated deposits and Silurian dolomite) are connected hydraulically and are recharged directly by seepage from precipitation (Willman 1971). The Maquoketa Group, composed primarily of non-water bearing shales, provides a hydrologic barrier between the shallow dolomite aquifer and the Cambrian-Ordovician aquifer. The Cambrian-Ordovician Aquifer is separated from the Elmhurst-Mt. Simon Aquifer by the shally and silty beds of the Eau Claire Formation, which prevent flow between the aquifers.

### 3.2.2 Site Hydrogeology

The site hydrogeologic study focused on the uppermost portion of the unconsolidated deposits. On November 29, 1993, groundwater levels were measured in each of the monitoring wells onsite. The water level data is presented in Table 2-1. The depth to water in the on-site wells ranged from 7.22 ft to 13.81 ft below ground surface. Based on the

water elevations, a groundwater elevation contour map (Figure 3-3) was prepared. Groundwater flow directions ranged from southwest to southeast and were towards Pettibone Creek. Thus, it appears that Pettibone Creek may be a local discharge area for shallow groundwater. The horizontal hydraulic gradient was in the range from 0.01 to 0.02 feet per foot (ft/ft).

Pettibone Creek flows from north to south across the site property. South of the site Pettibone Creek flows south and east through the Great Lakes Naval Training Center where it enters Lake Michigan approximately 1.2 miles from the site.

The elevation of the base of the Pettibone Creek was measured near the south and north ends of the site. The elevation at the south end was 637.58 ft above mean sea level (msl) while the elevation at the north end was 640.40 ft above msl. On November 29, 1993, groundwater elevations ranged from 635.65 ft above msl to 641.91 ft above msl. Based on a comparison of the water table elevations and the elevations at the base of the creek, it appears that shallow groundwater would discharge to Pettibone Creek. The water depth observed in the creek was only a few inches on November 29, 1993, which is consistent with the water table elevations relative to the creek base. The elevation of the water table relative to the base of the creek is illustrated in Cross Section A-A' (Figure 3-1).

### 3.3 GROUNDWATER QUALITY

The validated analytical results of samples collected for the groundwater investigation are presented in Tables 3-1 and 3-2. Data qualifiers from the data validation process have been included in the data summary tables to document the quality of the data. The data qualifiers were minimal and do not have any significant impact on interpretations or conclusions of this report.

Comparison of the quality control "GMMW-4" sample to its duplicate sample from Monitoring Well GMMW-3 indicated an excellent agreement in the compounds detected and

the concentrations at which they were found (Tables 3-1 and 3-2). The rinse blank sample showed a low concentration of the metal boron (0.084 mg/L), the likely source of which is the distilled water used for the blank.

### 3.3.1 Volatile Organic Compounds

VOCs were detected in Monitoring Wells MW-3, GMMW-2, and GMMW-3. The detected VOCs consisted exclusively of chlorinated compounds, including 1,1-dichloroethene (1,1-DCE), 1,2-DCE, trichloroethene (TCE), and vinyl chloride (VC). The sample from Monitoring Well MW-3 was found to contain the highest concentrations of VOCs.

Concentrations of the detected compounds were compared to water quality standards for Illinois Class I Potable Resource Groundwater (Table 3-1) [Illinois Administrative Code Title 35 Section 620.410 (35 IAC 620.410)]. It is noted that no determination has been made as to the classification of the shallow aquifer at the site; and therefore, Class I water quality standards may not apply. Water quality standards for Class II General Resource Groundwater are less stringent than the Class I water quality standards and may apply to this site. In Monitoring Well MW-3, the compounds 1,1-DCE, TCE, and VC were found to exceed the Class I water quality standards. Although standards have not been specified for total 1,2-DCE to date, the detected concentrations exceed standards specified for the isomers cis-1,2-DCE and trans-1,2-DCE (70  $\mu$ g/l and 100  $\mu$ g/L, respectively). The concentrations of 1,1-DCE, total 1,2-DCE, TCE, and VC in well MW-3 also exceed their respective Class II water quality standards.

The VOCs detected and the concentrations determined from the November 1993 sampling event are consistent with the IEPA sampling results discussed in Section 1.1.2. No VOCs were present in groundwater samples collected and analyzed in 1989 by MAECORP (1989) as previously discussed in Section 1.1.2.

The location of sources, and the delineation of lateral and vertical extent of VOC impacts were beyond the scope of the investigation conducted. The areal distribution and vertical extent of VOC impacts is a function of source location, time since release(s) occurred, groundwater flow direction and gradient, and site geology as it relates to preferential pathways for migration.

### 3.3.2 **Metals**

Data from the five samples collected and analyzed in November 1993 indicate there are no significant groundwater impacts with respect to metals. The groundwater sample and duplicate sample collected from Monitoring Well GMMW-3 were found to contain levels of manganese and arsenic that slightly exceed Class I water quality standards (Table 3-2). Analysis of the sample collected from Monitoring Well GMMW-2 also indicated manganese to exceed Class I water quality standards. However, arsenic and manganese are naturally-occurring constituents in groundwater and the concentrations measured may be a natural phenomenon.

Concentrations of metals detected in groundwater samples collected in November 1993 were consistent with IEPA 1993 groundwater data discussed in Section 1.1.2. However, metals data reported by MAECORP (1989) did identify groundwater impacts for barium, cadmium, chromium, lead, mercury, selenium and silver. The differences in metals results may be related to whether groundwater samples were field filtered before preserving with acid or not. Field filtered samples typically have lower metals concentrations. Geraghty & Miller standard protocol is to field filter groundwater samples from monitoring wells.

### 4.0 **SUMMARY AND CONCLUSIONS**

On behalf of The Northern Trust Company, Geraghty & Miller, Inc., conducted a groundwater quality investigation at the Stack Property in North Chicago, Illinois. The investigation was conducted to evaluate shallow groundwater quality, groundwater flow direction and the potential for offsite sources to impact groundwater quality on site. A summary of findings is presented in this section followed by associated conclusions.

#### 4.1 SUMMARY OF FINDINGS

The objectives of the study were met by installation of three additional monitoring wells to further characterize site geology and hydrogeology. Collection and analysis of groundwater samples from two existing and three new monitoring wells provided data relative to groundwater quality. A summary of findings relative to site geology and hydrogeology, as well as groundwater quality is presented below.

### 4.1.1 Geology

Materials in the shallow subsurface at the site have been investigated by installation of four previous and three new (November 1993) soil borings to depths of up to approximately 20 ft. Black, sandy fill material was present from ground surface to a depth of several feet across much of the site. Unconsolidated sediments of glacial origin underlay the fill and in descending order included a silt unit and a clay unit which were continuous across the site. The clay unit contains lenses of silt and sand which have limited lateral continuity. Laterally discontinuous sand and silt intervals, with a combined thickness of several feet, were present directly above the clay unit in the northern portion of the site. The geology of the shallow subsurface at the site was consistent with published reports for the area.

#### 4.1.2 Hydrogeology

Site specific information has been developed from previously installed soil borings (four) and monitoring wells (three), and three new (November 1993) monitoring wells. Groundwater was found to occur under water table conditions at depths of approximately 7 to 14 ft below ground surface within a silt unit or clay unit, depending on location at the site. Groundwater flow was generally southerly, with southwest and southeast components towards Pettibone Creek on the day measured. Pettibone Creek was at a low flow stage on the day that static groundwater level elevations were measured. Shallow groundwater from both Fansteel and EMCO would enter the Stack property according to the groundwater flow direction determined from measurements made on November 29, 1993. Horizontal gradients at the water table ranged from 0.01 to 0.02 ft/ft.

The character of subsurface sediments on the Fansteel property, to depths of 11 to 25 ft below ground surface, could not be determined due to lack of detail in cross sections reviewed. A clay unit was present below depths of 11 to 25 ft, and continued down to at least 40 ft, according to information reviewed for the Fansteel property.

### 4.1.3 **Groundwater Quality**

Chlorinated VOCs were detected in three of five on-site monitoring wells sampled in November 1993. The highest VOC concentrations were found in Well MW-3 which contained 1,1-DCE, 1,2-DCE, TCE, and VC in concentrations above Illinois Class I Potable Resource Groundwater Standards and Class II General Resource Groundwater Standards. Well GMMW-3 also contained VC at a concentration above both the Class I and Class II water quality standards. The November 1993 sampling results were consistent with groundwater samples collected and analyzed by IEPA in 1993.

Identification of VOC sources, and delineation of the lateral and vertical extent of VOC impacts were beyond the scope of the investigation conducted. The areal distribution

and vertical extent of VOC impacts is a function of source location, the time since the release(s) occurred, groundwater flow direction and gradient, and site geology as it relates to preferential pathways for migration.

No significant groundwater impacts with respect to metals were evident based on the November 1993 sampling data. Concentrations of arsenic in one instance, and manganese, in two instances, which exceed standards for Illinois Class I groundwater could be due to natural causes. The November 1993 data are consistent with the IEPA 1993 data, but not with the 1989 MAECORP data. Sampling procedures related to field filtering groundwater samples may be a major factor in explaining the differences.

#### 4.2 CONCLUSIONS

Conclusions of the investigation relative to site geology and hydrogeology, as well as groundwater quality are presented below.

### 4.2.1 Geology

Conclusions regarding the nature of materials present in the shallow subsurface are as follows:

- Black, sandy fill, typically several feet in thickness, is present across most of the site, except possibly west of Pettibone Creek.
- Fill materials are underlain by materials of glacial origin with deposits of permeable materials (sand and silt) more prevalent in the northern portion of the site.
- The continuity of sand and silt deposits from the Stack Property east to the Fansteel RCRA unit could not be determined from the documents reviewed.

### 4.2.2 Hydrogeology

Conclusions regarding the nature and occurrence of shallow groundwater at the site are as follows:

- Groundwater occurs under water table conditions at shallow depths (less than 15 ft) below ground surface.
- Shallow groundwater probably discharges to Pettibone Creek during some periods of the year.
- Groundwater flow was onto the Stack property from neighboring properties to the east (Fansteel) and the west (EMCO) on the day measurements were made.
- The areal and vertical distribution of saturated, permeable glacial sediments will strongly influence the migration of contaminants in shallow groundwater at the site. The northern portion of the site is more susceptible to the spread of contaminants due to the more extensive sand and silt deposits.

### 4.2.3 Groundwater Quality

Conclusions regarding groundwater quality conditions are as follows:

- Shallow groundwater at the site is impacted by chlorinated VOCs with one or more VOCs present at concentrations above both Illinois Class I Potable Resource Groundwater Standards and Class II General Resource Groundwater Standards at two monitoring wells (MW-3 and GMMW-3).
- The data collected do not indicate shallow groundwater has been impacted by metals.

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Table 2-1. Groundwater Elevation Data, November 29, 1993, Stack Property, North Chicago, Illinois.

	Measuring	Depth to	Groundwater
Weil	Point Elevation (ft)	Water (ft)	Elevation (ft)
MW-1	651.83	9.92	641.91
MW-2	651.03	NM <sup>2</sup>	NM
MW-3	650.43	10.34	640.09
GMMW-1	651.61	15.96	635.65
GMMW-2	650.99	10.60	640.39
GMMW-3	649.72	11.49	638.23

<sup>1.</sup> Feet above mean sea level.

CI0325.002\Table2-1.WK1

<sup>2.</sup> Not measured.

### Table 2-2 TARGET ANALYTE LIST

EPA Methods Various Matrix: Water/Soil/Semisolid  1. Aluminum 2. Antimony 3. Arsenic 4. Barium 5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc 23. Boron	Metals (TCL/HSL/Superfund)							
1. Aluminum 2. Antimony 3. Arsenic 4. Barium 5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
2. Antimony 3. Arsenic 4. Barium 5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc	Matrix: Wate	er/Soil/Semisolid						
2. Antimony 3. Arsenic 4. Barium 5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
2. Antimony 3. Arsenic 4. Barium 5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
2. Antimony 3. Arsenic 4. Barium 5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc	i. Alum	ninum						
4. Barium 5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc	3. Arsei	nic						
5. Beryllium 6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc	4. Bariu	ım						
6. Cadmium 7. Calcium 8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
8. Chromium 9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
9. Cobalt 10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
10. Copper 11. Iron 12. Lead 13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
12. Lead  13. Manganese  14. Mercury  15. Nickel  16. Potassium  17. Selenium  18. Silver  19. Sodium  20. Thallium  21. Vanadium  22. Zinc								
13. Manganese 14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
14. Mercury 15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
15. Nickel 16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
16. Potassium 17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
17. Selenium 18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
18. Silver 19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
19. Sodium 20. Thallium 21. Vanadium 22. Zinc								
20. Thallium 21. Vanadium 22. Zinc								
21. Vanadium 22. Zinc								
22. Zinc								

### Instructions for Use:

- If all compounds required leave boxes blank.
- 2.
- If only certain compounds are required place an X in box next to compound.

  If certain compounds should be deleted from report cross out entire compound with heavy 3. black felt tip pen.

## Table 2-2 TARGET ANALYTE LIST (continued)

Volatile Organic Compounds EPA Methods 624-CLP-M/624/8240/8260						
Matrix: Water/Soil/Semisolid						
1. 1,1,1-Trichloroethane						
2. 1,1,2,2-Tetrachloroethane						
3. 1,1,2-Trichloroethane						
4. 1,1-Dichloroethane						
5. 1,1-Dichloroethane						
6. 1,2-Dichloroethane						
7. 1,2-Dichloroethane (total)						
8. 1,2-Dichloropropane						
8. 1,2-Dictiotopropane 9. 2-Butanone						
9. 2-Butanone 10. 2-Hexanone						
11. 4-Methyl-2-pentanone						
12. Acetone						
13. Benzene						
14. Bromodichloromethane						
15. Bromoform						
16. Bromomethane						
17. Carbon Disulfide						
18. Carbon Tetrachloride						
19. Chlorobenzene						
20. Chloroethane						
21. Chloroform						
22. Chloromethane						
23. cis-1,3-Dichloropropene						
24. Dibromochloromethane						
25. Ethyl Benzene						
26. Methylene chloride						
25. Nichryteine emoriale 27. Styrene						
28. Tetrachloroethene						
29. Toluene						
30. trams-1,3-Dichloropropene						
31. Trichloroethene						
32. Vinyl Acetate						
33. Vinyl Chloride						
34. Xylenes (total)						
57. Aylence (total)						

### Instructions for Use:

- If all compounds required leave boxes blank. 1.
- 2.
- If only certain compounds are required place an X in box next to compound.

  If certain compounds should be deleted from report cross out entire compound with heavy 3. black felt tip pen.

Table 3-2 Summary of Analytical Results for Metals Stack Property, North Chicago, Illinois

Sample Number:	MW-1	MW-3	GMMW-1	GMMW-2	GMMW-3	Rinse	'GMMW-4	Class I	Class II
Compound		mad	ma/l	mall	mg/L	Blank ma#		Standard	Standard
Compound	mg/L	mg/L	mg/L	mg/L		mg/L	mg/L.	mg/L	mg/L
Aluminum	<0.05	<0.05	< 0.05	< 0.05	< 0.05	<0.05	<0.05	NS	NS
Antimony	<0.03	<0.03	<0.03	< 0.03	< 0.03	<0.03	< 0.03	NS	NS
Arsenic	<0.005	<0.005	<0.005	<0.005	0.1	< 0.005	0.092	0.05	0.2
Barium	0.089	0.069	0.032	0.12	0.15	<0.01	0.15	2	2
Beryllium	<0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	<0.005	NS	NS
Boron	0.089	0.069	0.032	0.12	0.15	0.084	1.6	2	2
Cadmium	0.0019	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	< 0.001	0.005	0.05
Calcium	J 120	J 100	J 150	J 130	J 160	J<0.2	J 160	NS	NS
Chromium	<0.01	<0.01	< 0.01	< 0.01	< 0.01	<0.01	<0.01	0.1	1
Cobalt	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	1	1
Copper	0.028	< 0.02	< 0.02	< 0.02	< 0.02	<0.02	< 0.02	0.65	0.65
Iron	J<0.025	J<0.025	J 0.49	J 1.3	J 3.5	J<0.025	J 2.8	5	5
Lead	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.0075	0.1
Magnesium	32	45	76	50	81	<0.2	84	NS	NS
Manganese	J 0.048	J 0.019	J 0.065	J 0.25	J 0.43	J<0.01	J 0.44	0.15	10
Mercury	< 0.0005	<0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	< 0.0005	0.002	0.01
Nickel	<0.01	<0.01	< 0.01	< 0.01	< 0.01	<0.01	<0.01	0.1	2
Potassium	21	4.7	3.3	18	3.2	<0.2	3.2	NS	NS
Selenium	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	0.05	0.05
Silver	<0.01	< 0.01	< 0.01	< 0.01	<0.01	<0.01	<0.01	0.05	NS
Sodium	42	73	19	71	62	<0.2	63	NS	NS
Thallium	0.02	<0.02	< 0.02	< 0.02	< 0.02	<0.02	<0.02	NS	NS
Vanadium	<0.01	< 0.01	< 0.01	< 0.01	< 0.01	< 0.01	<0.01	NS	NS
Zinc	0.26	<0.02	0.021	0.046	<0.02	<0.02	<0.02	5	10

<sup>\*</sup> Sample GMMW-4 is a duplicate of the sample collected from Monitoring Well GMMW-3.

Light shade indicates that the analyte concentration exceeds Illinois Class I Groundwater Quality Standards.

NS indicates that a cleanup objective has not been specified for the constituent.

CI0325.002\STAK\_INO.WK1

J Concentration or detection limit is estimated based on validation of data.

Table 3-1 Summary of Analytical Results for Volatile Organic Compounds Stack Property, North Chicago, Illinois.

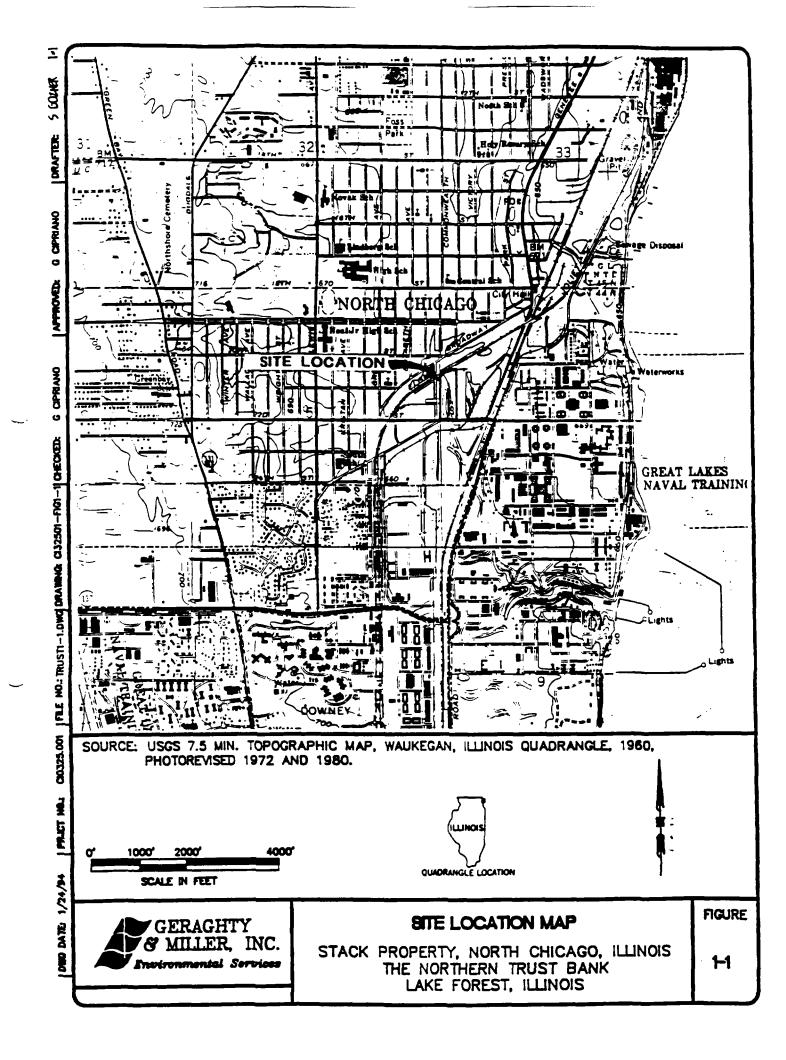
Sample Number:	MW-1	MW-3	GMMW-1	GMMW-2	GMMW-3	Rinse	*GMMW-4	Class I	Class II
						Blank		Standard	Standard
Compound	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L	ug/L
Acetone	<20	<20	<20	<20	<20	<20	<20	NS	NS
Benzene	<5	<5	<5	<5	<5	<5	<5	5	25
Bromodichioromethane	<5	<5	<5	<5	<5	<5	<5	NS	NS
Bromoform	<5	<5	<5	<5	<5	<5	<5	NS	NS
Bromomethane	<10	<10	<10	<10	<10	<10	<10	NS	NS
Carbon disulfide	<5	<5	<5	<5	<5	<5	<5	NS	NS
Carbon tetrachloride	<5	<5	<5	<5	<5	<5	<5	5	25
Chlorobenzene	<5	<5	<5	<5	<5	<5	<5	NS	NS
Chloroethane	<10	<10	<10	<10	<10	<10	<10	NS	NS
Chloroform	<5	<5	<5	<5	<5	<5	<5	NS	NS
Chloromethane	J<10	J<10	J<10	J<10	J<10	J<10	J<10	NS	NS
Dibromochloromethane	<5	<5	<5	<5	<5	<5	<5	NS	NS
cis-1,3-Dichloropropene	<5	<5	<5	<5	<5	<5	<5	NS	NS
1,1-Dichloroethane	<5	<5	<5	<5	<5	<5	<5	NS	NS
1,2-Dichloroethane	<5	<5	<5	<5	<5	<5	<5	5	25
1,1-Dichloroethene	<5	47	<5	<5	<5	<5	<5	7	35
1,2-Dichloropropane	<5	<5	<5	<5	<5	<5	<5	5	23
Ethylbenzene	<5	<5	<5	<5	<5	<5	<5	700	1000
2-Hexanone	<10	<10	<10	<10	<10	<10	<10	NS	NS
Methylene chloride	<5	<5	<5	<5	<5	<5	<5	NS	NS
2-Butanone (MEK)	<10	<10	<10	<10	<10	<10	<10	NS	NS
4-Methyl-2-pentanone	<10	<10	<10	<10	<10	<10	<10	NS	NS
Styrene	<5	<5	<5	<5	<5	<5	<5	100	500
1,1,2,2-Tetrachloroethane	<5	<5	<5	<5	<5	<5	<5	NS	NS
Tetrachloroethene	<5	<5	<5	<5	<5	<5	<5	5	25
Toluene	<5	<5	<5	<5	<5	<5	<5	1000	2500
1,2-Dichloroethene (total)	<5	J13000	<5	23	17	<5	17	NS	NS
Trans-1,3-dichloropropene	<5	<5	<5	<5	<5	<5	<5	NS	NS
1,1,1-Trichloroethane	<5	<5	<5	<5	<5	<5	<5	200	1000
1,1,2-Trichloroethane	<5	<5	<5	<5	<5	<5	<5	NS	NS
Trichloroethene	<5	110	<5	<5	<5	<5	<5	5	25
Vinyl acetate	<10	<10	<10	<10	<10	<10	<10	NS	NS
Vinyl chloride	<10	J1000	<10	<10	13	<10	14	2	10
Xylenes (total)	<5	<5	<5	<5	<5	<5	<5	10000	10000

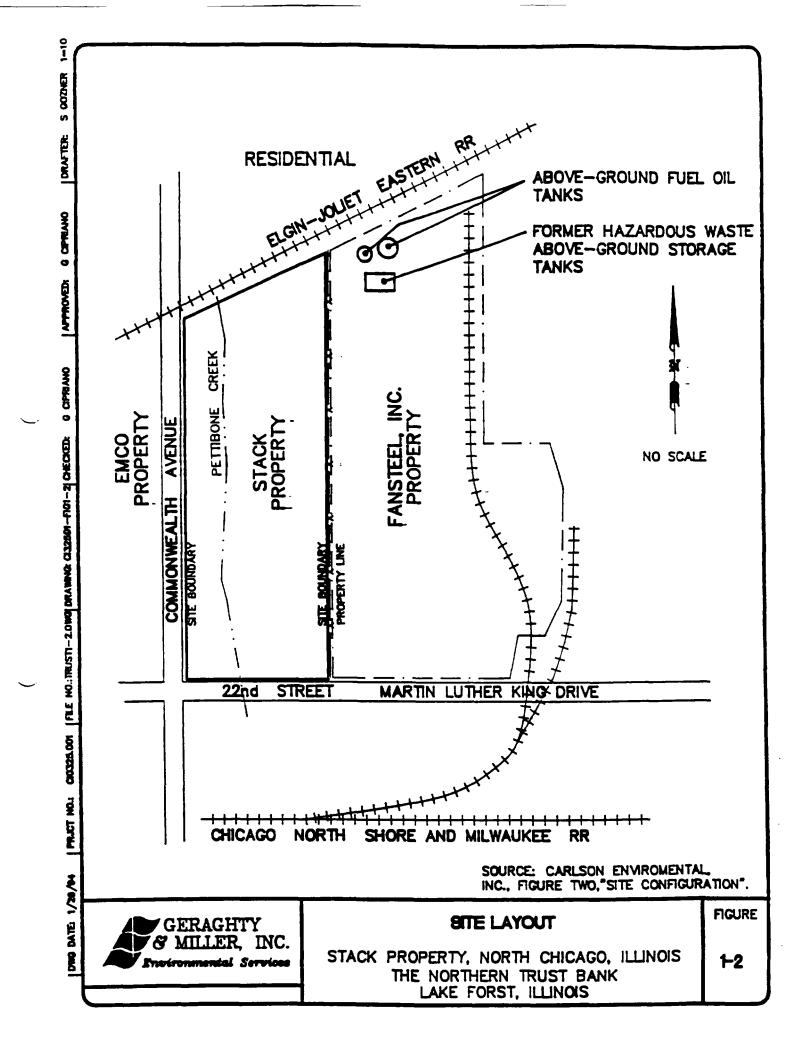
<sup>\*</sup> Sample GMMW-4 is a duplicate of the groundwater sample collected from Monitoring Well GMMW-3.

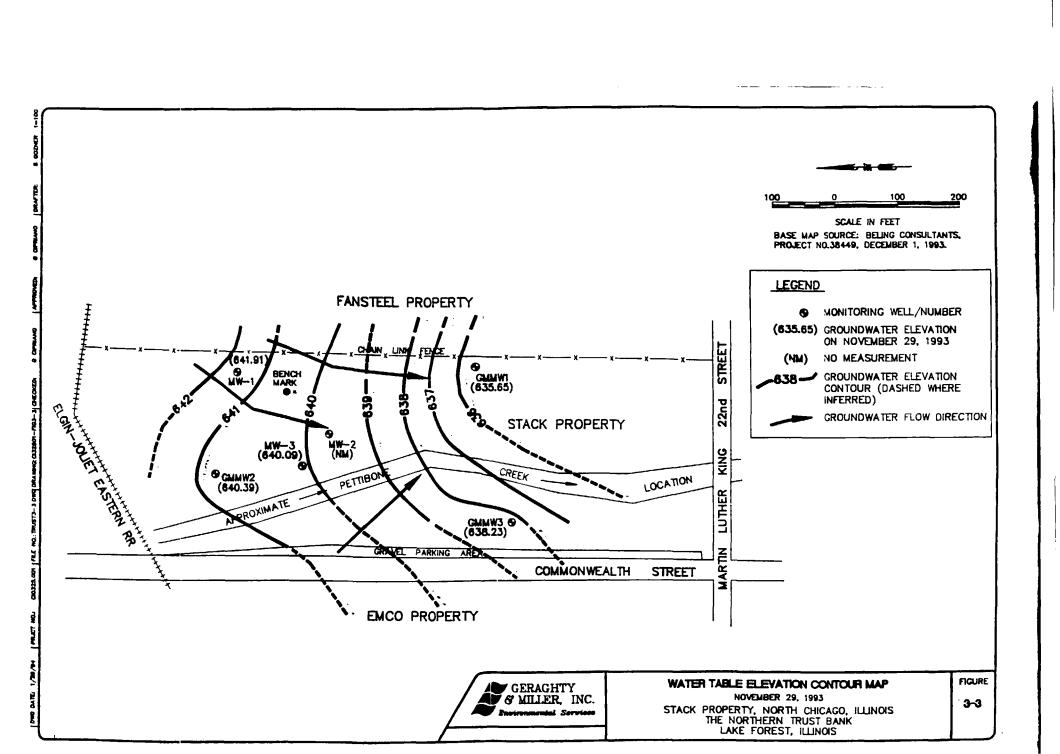
Light shade indicates that the compound concentration exceeds Illinois Class I Groundwater Quality Standards.

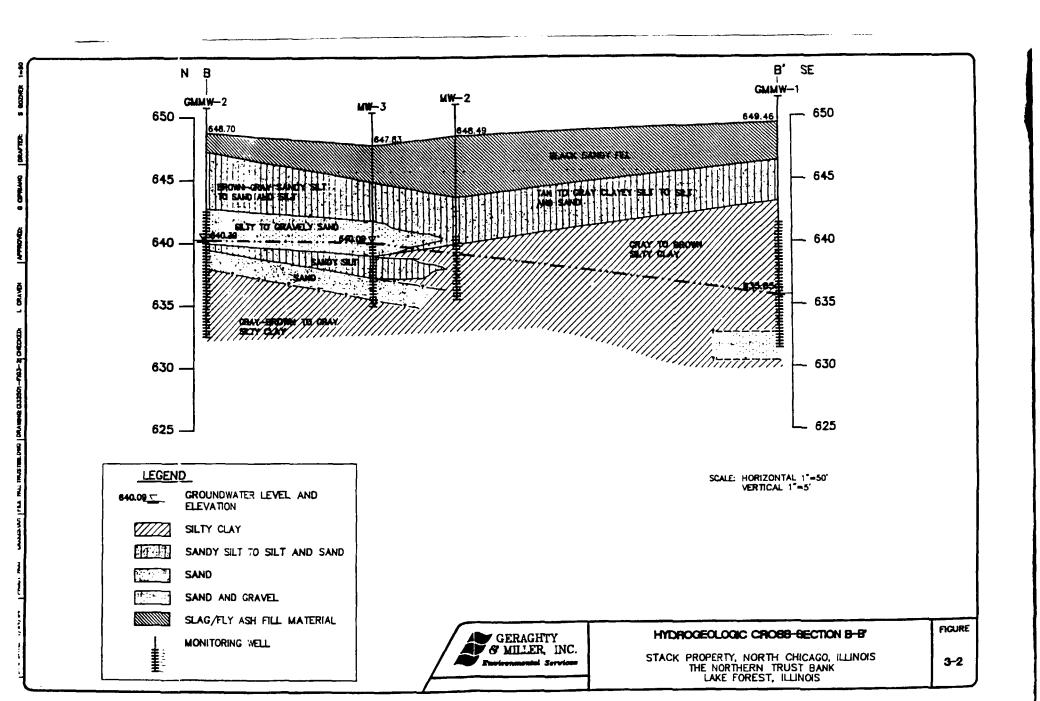
NS indicates that a cleanup objective has not been specified for the compound.

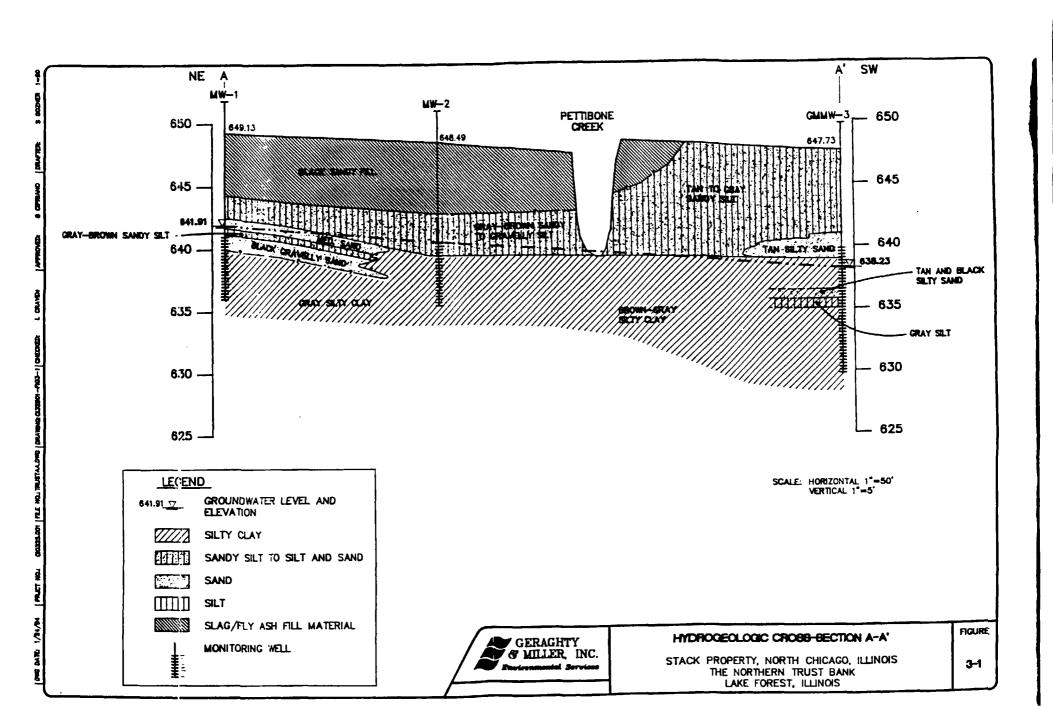
J Concentration or detection limit is estimated based on validation of data.

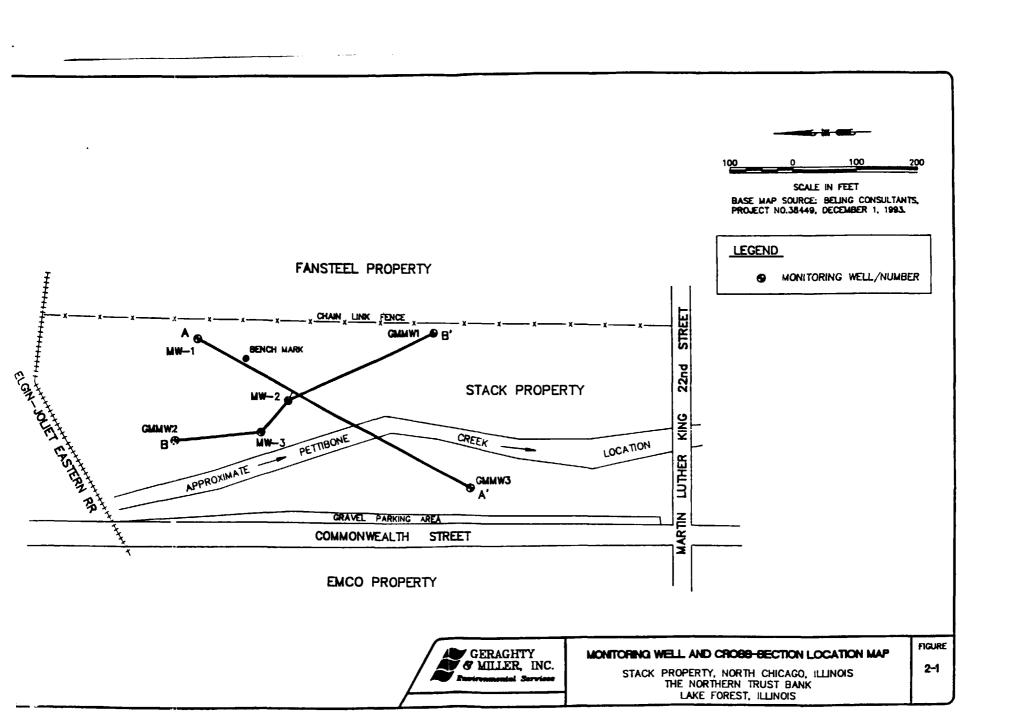












# APPENDIX A

Monitoring Well and Soil Boring Logs

# WELL CONSTRUCTION LOG

(UNCONSOLIDATED)

	Project	Stack Property	Well	GMMW-1
	Town/City No	rth Chicago		<del></del>
LAND SURFACE	County Lake	<u> </u>	State Illinois	i
T LAND SUNFACE	Permit No	<del></del>	<del></del>	
81/2"	Land-Surface E		☑ Sur	•
drilled hole		649.46 fe	et 🔲 Est	imated
	NAVD		<del></del>	
Well casing, 2 inch diameter,	Installation Dat	e(s) November 19, 195	93	
PVC	Drilling Method	Hollow stem auger	<del></del> -	
Backfill	Drilling Contrac	tor Rock & Soil Drillin	ng Corp.	
Grout Bentonite chips	Drilling Fluid N	lone		·
	<del></del>			
4 +	·	echnique(s) and Date(s		
Bentonite 🔲 slurry		d nylon rope.		
6 t° pellets	November 22,	1993.	<del></del>	<del></del>
	<del></del>		<del></del>	<del></del>
		ng Drilling		
8 *	9	d During Development		
Well Screen		Water 16		<del>_</del> _
2 inch diameter		to Water		teet below M.P.
		ion <u>0.75</u>		
Gravel Pack			_	
Sand Pack Formation Collapse		ity		
	Well Purpose	Groundwater quality	monitoring, flow	v direction.
18 to				<del></del>
=		des als to = - d'		Morie Ce
	Hemarks San	dpack is medium grain	ned silica sand t	y Morie Co.
		<del></del>	<del></del>	
Measuring Point is  Top of Well Casing	l <del></del>	<del></del>		
Unless Otherwise Noted.				
*Depth Below Land Surface		<del> </del>		
DOPUL DOWN LEIN DULISCE				
	Bronnerd by D	ouglas K. Cowin		

# WELL CONSTRUCTION LOG

(UNCONSOLIDATED)

	Project Stack Property	Well <b>GMMW</b> -2
	Town/City North Chicago	
	County Lake	State Illinois
1 LAND SURFACE	Permit No.	
8 1/2"	Land-Surface Elevation	
inch diameter	and Datum 648.70 feet	□ Estimated
drilled hole	NAVD	
Well casing,	Installation Date(s) November 19, 1993	
inch diameter, PVC	Drilling Method Hollow stem auger.	
Backfill	Drilling Contractor Rock & Soil Drilling	Corp
Grout Bentonite chips	Drilling Fluid None	<u> </u>
	Drining Field French	
// // 3 <b>e</b>	Development Technique(s) and Date(s)	
	PVC bailler and nylon rope.	
Slurry  5 t	November 22, 1993.	
	Fluid Loss During Drilling	None gallons
	Water Removed During Development	
	Static Depth to Water 7.51	
Well Screen  2 inch diameter  PVC , 10 slot  Gravel Pack Sand Pack Formation Collapse	Pumping Depth to Water N	
2 inch diameter	Pumping Duration 0.5	
	Yield gpm	_ //ours Date
Gravel Pack	· · - · - ·	<del></del>
Sand Pack Formation Collapse	Specific Capacity	
	Well Purpose Groundwater quality mo	nitaring, now direction.
16 🕊		
18 <b>t</b> *	Remarks	<del></del>
_		
Measuring Point is Top of Well Casing		
Unless Otherwise Noted.		<del></del>
*Depth Below Land Surface		
Deput Defow Laik Surface		
	Prepared by Douglas K Cowin	

soring/vv	ell GMM	<u>1W-1</u>	_ Project/No	Stack Property/Cl0325.001 Page	1 of 2
ite ocation	North C	hicago	·	Drilling Drilling Complete 11/19	9/93
`otal Depth Dri	illed 20		feet Hole	Diameter 8 1/2 inches Coring Device Split Spoon	
ength an			2'	Sampling Interval Continous	feet
and-Sur	face Elev	, <u>649</u>	.46 feet	Surveyed Estimated Datum NAVD	
Orilling Fl	uid Used	None	) 	Drilling Method Hollow stem auger	
rilling Contracto	Rock	& Soil	Drilling Corp.	Driller Tim Helper Scott	
repared y Doug		<del> </del>		Hammer Hammer Weight 140 Drop 30	inches
Sample/C. (feet below i	ore Depth land surface) To	Care Recevery (feet)	Time/Hydraulic Pressure or Blews per 6 inches	Semple/Core Description	HNu
0	2	15"	3/2/3/4	Loose, fine to medium grain, black to tan, silty sand	0
			· 	appearance of siag.	
2	4	0	50/5*	Drove cobble.	0
4	6	19"	10/18/18/	Upper 11": Tan to peach to gray, clayey silt, 10-15%	0
			15	component of coarse sand, moist.	
			: i	[Black, slough organic soil at tip.]	
	: :		} 	Lower 8": Same as above, more sand 50%.	
6	8	14"	11/15/23	Upper 4*: Tan silt, well sorted, moist lacustrine	0
	 !		26	appearance.	
,				Lower 10": Silty clay with little sand, coarse,	
			 	rounded, brown (till) silty lenses, moist.	
8	10	19"	6/12/14/17		
				Silty lens at 8 1/2 ft is subvertical, rust color.	
10	12	23*	3/6/13/15	Same as above. Rust-color lens (1/8") at	0
·				11 ft. connecting vertical crack.	
12	14	24*	8/11/12/12	Brownish gray, same as above.	••
				Lens of fine sand (1") at 13.5 ft is not saturated.	0
14	16	24*	5/9/11/16	Same as above. Lenses of fine sand at 14.1 ft	
				and 15.8 ft; not saturated.	
				· · · · · · · · · · · · · · · · · · ·	•

epare Dou	d g Cowi	<u>n</u>			
	ere Depth land surface To	i Cere Recevery (feet)	Time/Hydraulic Pressure er Blews per 6 inches	Sample/Cere Description	HNu
16	18	23"	12/10/13	Upper 8*: Same as above.	0
			12	Lower 15": Fine to coarse sand and gravel, little	
				silt, wet, gray to black to white grains.	
				•	
18	20	22*	7/9/12/15	: Upper 13": Same as above.	0
				Lower 9": Very tight brown clay, no inclusions.	
				• • •	
			,		
			1	· •	
			<u>:</u>	· .	
					<b></b>

Boring/W	ell GMM	W-2	Project/No	Stack Property / CI0325.001 Page	1 of 2
Site Location	North C	hicago		Drilling Drilling Complete 11/1	9/93
Total	illed <u>18</u> .	-		Diameter 8 1/2 inches Coring Device Split Spoon	
	nd Diame Device			Sampling Interval Continuous	feet
Land-Sur	face Elev	. <u>648</u> .	70 feet	Surveyed Estimated Datum NAVD	
_	luid Used	None		Drilling Method Hollow stem auger	
Drilling Contracto	Rock	& Soil	Drilling Corp.	Driller Tim Helper Scott	
Prepared By <u>Doug</u>	Cowin			Hammer Hammer Drop 30	inches
	ore Depth lend surface) To	Core Recovery (feet)	Time/Hydraulic Pressure er Blews per 6 inches	Sample/Cere Description	HNu
0	2	19	1/8/14/9	Upper 17":Black to dark brown fine to medium grain	0
				slag appearing material/fly ash, moist, loose, sandy.	1
				Lower 2": Silt grain size.	
2	4	16	4/7/9/11	Black silt, some clay, little coarse sand, plastic,	0
				moist. Lower 3" becoming green/gray mottled silt.	
4	6	17	5/6/8/9	Tan to gray mottled silty fine sand/fine sandy silt,	o
				loose, moist.	
		i !		Lower 2" becoming more clayey.	}
6	8	1 "	12/18/16	Loose, tan , fine sand, moist, little rounded	0
			24	coarse sand.	
8	10	17"	5/11/10/12	Upper 5": Same as above.	0
				Upper middle 1": Lens of gray silt.	i
				Lower middle 3": Fine to coarse sand and gravel,	
				wet, tan to gray to green (glauconite?)	
				Lower 5": Silt. Tip: black to white to gray, fine to	ļ
				coarse sand, wet. Same appearance as sand at	
				MW-1.	
10	12	17*	4/5/7/11	Upper 7": Same as above.	0
				Lower 10": Grayish brown clay with trace coarse	
				sand (fill), stiff, slightly plastic.	
12	14	22"	5/7/13/17	Same as above.	0

Boring A		MMW-2		Page 2	of2
By Dor	g Cowir	<u> </u>			
	iere Depth Isnd surface) Te	Core Recovery (feet)	Time/Mydraulic Pressure or Blowe per 6 inches	Sample/Cere Description	MNu
14	16	23"	7/10/17/18	Same as above, very stiff, green pebbles-friable-	0
				(limestone?)	
16	: 18	24*	3/9/14/17	Same as above.	0
	1 6 1				
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	1				

Boring/We	II GMM	1W-3_	_ Project/No	Stack Property/ CI0325.001 Page _	_1_ of _2_
Site Location _	North (	hicago		Drilling Drilling Complete 11/1	9/93
Fotal Depth Dril	led _18	.0	feet Hole	Diameter 8 1/2 inches Type of Sample/ Coring Device Split Spoon	
ength and of Coring (			2'	Sampling Interval Continous	feet
and-Surf	ace Ele	v. <u>647</u>	.73 feet	Surveyed Estimated Datum NAVD	
Orilling Flu	ıid Used	None	1	Drilling Method Hollow stem auger	<u> </u>
Orilling Contractor	Rock	& Soil	Drilling Corp.	Driller Tim Helper Scott	··
repared By Doug		-		Hammer Weight 140 Hammer Drop 30	inches
Sample/Cer ifeet below is Frem		Care Recevery (feet)	Time/Hydraulic Pressure er Blews per Binches	Sample/Cere Description	HNu
0	2	10"	3/6/15/15	Upper 5": Black organic silty soil, moist.	0
·	•			Lower 5": Tan to rust color fine sandy silt, little	·
	1			pebbles, rounded, moist, plastic.	
2	4	15"	6/5/8/10	Same as above.	0
4	6	15"	4/4/4/6	Same as above, becoming mottled with gray silt	0
		. •	1	at 5.5 ft. Observe glass shard at 5 ft.	
				at 5.5 ft. Observe glass share at 5 ft.	}
6	8	20"	5/8/9/14	Upper 11": Same as above.	0
!				Lower 10": Tan, laminated ,silty fine sand, moist,	•
				very well sorted.	† †
8	10	24"	5/10/10/11	Upper 9*: Same as above, darker tan.	. 0
				Lower 15": Tan, silty clay, moist, plastic, slightly	
				mottled, lower 5" more gray mottles.	
	,			Very well sorted.	
10	12	17*	4/6/10/16	· · · · · · · · · · · · · · · · · · ·	0
10	12		4/6/10/16	Upper 12": Same as above.	
				Lower 5*: Tan and black very finely laminated silty	
				fine sand, loose, moist, lacustrine appearance.	
12	14	23*	6/7/9/9	Upper 6*: Gray, laminated silt, moist to wet, little	0
				fine sand.	
				Lower 17": Brownish gray clay, stiff, slightly moist,	
1				little coarse sand and gravel (till).	0

Boring/V	Vell G	MMW-3		Page 2	of 2
Prepare By Dou	d g Cowi	n			
Semple/C ifeet below From	ore Depth land surface To	i Cere Resevery (feet)	Time/Hydraulic Pressure er Blews per 6 inches	Sample/Core Description	HNu
14	16	23*	7/14/16/20	Upper 22": Same as above, gray.	0
				Lower 1": Silt with fine to coarse sand, gray, stiff.	<u> </u>
16	1'8	24"	5/8/10/16	Same as above, with lower 4" becoming silty.	0
			•	i ;	<u> </u>
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	ł				
			<u> </u>		

## APPENDIX B

Data Validation and Laboratory Groundwater Analytical Results

## APPENDIX B

# ANALYTICAL LABORATORY DATA VALIDATION NORTHERN TRUST STACK PROPERTY CHICAGO, ILLINOIS

#### **OUALITY ASSURANCE SUMMARY**

This report presents the review and validation of sample data contained within the Sample Delivery Group (SDG) for the Northern Trust Stack Property located in Chicago, Illinois. The review and validation determined the validity of data from groundwater samples obtained during November 29, 1993. Samples were sent, by overnight express courier, to Heritage Laboratories, Inc. (Heritage) located in Indianapolis, Indiana for analysis. Analytical tests included volatile organics analysis (VOA) and metals. Analyses followed methods specified in the chain-of-custody forms submitted with the samples. The methods selected for analysis are from the United States Environmental Protection Agency (USEPA) document "Test Methods for Evaluating Solid Waste, Physical and Chemical Methods" (USEPA 1986). Data were evaluated in accordance with the data quality objectives (DQOs) set forth in the Geraghty & Miller Level III Laboratory Reportables. The data validation followed rules from "Functional Guidelines for Evaluating Inorganics Analyses" (USEPA 1988) and "Functional Guidelines for Evaluating Organics Analyses" (USEPA 1988). Data review did not include the examination of raw data and/or some calibrations.

The data validation and review process followed the scheme set forth in the USEPA guidelines. Each validation parameter had certain criteria against which the data were evaluated. Each criterium was judged by the experience of the validator whether the effect, positive or negative, influenced the usability of the data. The goal of this data validation process was to ensure the integrity of the data that will be usable, not to arbitrarily disqualify data. Data were qualified at one of three levels of data usability:

Qualitative (Level A) data have failed some quality assurance function and have been given an estimated (J) flag. Data were somewhat suspect but may be used in the decision-making process. Qualitative data should not be used for remediation activities.

Quantitative (Level B) data must meet all specified quality assurance functions. These data have no qualifications and may be used for any purpose.

Unusable data have failed the requirements within the quality assurance framework at significant levels. These data must not be used for any purpose. These data will be flagged as "R" on reports.

Analytical data in these SDGs were judged against the above list and against the type of matrix and the location of samples to ascertain usability. Sample data were reviewed in accordance with the matrix type (soil/water), category (organic/inorganic), and analytical procedure group (metals/volatiles/semivolatiles).

#### ORGANICS SUMMARY

## Volatile Organics Analysis

The samples were analyzed within acceptable holding times. The surrogates and internal standard compounds were outside the limits on sample GMMW-1. Subsequent reanalysis of GMMW-1 by Heritage was acceptable and the second data package was reported. Sample MW-3 had high results for several compounds of interest on the first analysis of December 8, 1993. MW-3 was diluted and reanalyzed by Heritage. Both sets of data are reported, however, the diluted analysis results are qualified as estimated (J) values due to the dilution. Othr significant quality assurance failures in the VOA were not noted during the data review and validation. Details of the variances are discussed in the following sections.

#### **INORGANIC SUMMARY**

#### <u>Metals</u>

The samples were analyzed within acceptable holding times. The reinstate (field) blank contained boron at 0.084 milligrams per Liter (mg/L). No other contaminants were noted in the blanks associated with the data package. The inductively coupled plasma (ICP) interference check sample ran on December 6, 1993 has copper recovery at 127 percent (%). Since all copper results were less than the instrument detection limit (IDL), no data were qualified. The ICP serial dilution results show that calcium, iron, and manganese exceed the dilution recovery percent. Data associated with these results were qualified as estimated (J). Other significant quality assurance failures were not noted in these data packages. Details of the quality assurance review are provided in the following sections.

#### **VOLATILE ORGANICS**

#### **HOLDING TIMES**

Holding times were acceptable for all samples.

#### GAS CHROMATOGRAPHY/MASS SPECTROSCOPY INSTRUMENT TUNING

The instrument tuning criteria were acceptable for all samples.

#### **CALIBRATION**

#### Initial

The initial calibrations were acceptable for all samples

#### Continuing

Some minor quality assurance failures within the continuing calibration data were noted. The following are the quality assurance failures and associated samples.

Date:

December 8, 1993

**Instrument:** 

GC/MS VOA

Samples Affected: GMMW-3, GMMW-4, GMMW-1, GMMW-2, MW-1, MW-3,

Reinstate

Constituent

**Ouality Assurance Failure** 

Chloromethane

25.8 percent difference (%D)

Date:

December 9, 1993

**Instrument:** 

GC/MS VOA

Samples Affected: GMMW-1.

Constituent

Quality Assurance Failure

Dichlorodifluoromethane

46.4 %D

Date:

December 10, 1993

Instrument:

GC/MS VOA

Samples Affected:

MW-3.

Constituent

**Ouality Assurance Failure** 

Dichlorodifluoromethane

41.0 %D

Analytical results associated with the above calibration constituents were qualified as estimated (J).

#### **BLANKS**

#### Method Blank

Contaminants were not noted in the method blanks.

#### Field Blank

Contaminants were not noted in the field blank.

#### SURROGATE RECOVERY

Sample GMMW-1 failed all three surrogate recovery limits. Subsequent reanalysis (December 9, 1993) of GMMW-1 was acceptable. The second analysis results are reported and should be used for project purposes. All other surrogates were acceptable on the first analysis.

#### MATRIX SPIKE/MATRIX SPIKE DUPLICATE (MS/MSD)

Sample GMMW-2 was used for MS/MSD purposes. Toluene analytical results from December 9, 1993 were outside the percent recovery limits. Since MS/MSD limits are advisory and the surrogate results are acceptable, qualification of the associated data was not required. MS/MSD results for all other days were acceptable.

#### INTERNAL STANDARDS

GMMW-1 internal standard results were outside acceptance limits for the December 8, 1993 analysis. Subsequent reanalysis of the sample on December 9, 1993 produced acceptable results.

## **INORGANICS - METALS**

## **HOLDING TIMES**

The sample holding times were acceptable.

## **CALIBRATION**

## **Initial Calibration**

The initial calibration results were acceptable for all samples.

# **Continuing Calibration**

The continuing calibration results are acceptable for all samples.

#### **BLANKS**

## **Initial Calibration Blanks**

No contaminants were noted in the blanks.

#### Continuing Calibration Blanks

No contaminants were noted in the blanks.

## Preparation Blanks

No contaminants were noted in the preparation blanks.

#### Reinstate (Field) Blank

No contaminants were noted in the field blank.

#### INDUCTIVELY COUPLED PLASMA INTERFERENCE CHECK SAMPLE

Copper results from the December 6, 1993 analyses were outside the interference check samples limits. Data greater than the instrument detection limits (IDLs) should be qualified as estimated (J). All data associated with this result are less than the IDL, therefore sample results were not qualified. All other quality assurance results were acceptable.

#### LABORATORY CONTROL SAMPLE

Laboratory control sample results were acceptable.

#### LABORATORY DUPLICATE

GMMW-2 was used for the laboratory duplicate. The RPD was acceptable.

#### MATRIX SPIKE

Sample GMMW-2 was used for MS purposes. The analytical results for the MS are acceptable.

#### INDUCTIVELY COUPLED PLASMA SERIAL DILUTION

Calcium, iron, and manganese exceed the dilution check sample acceptance limits. The data associated with these elements are qualified as estimated (J).

# CONCLUSION

Overall, the data reported in the packages were acceptable for use within the limitation of the validation (Geraghty & Miller Level III). Other quality assurance variances may not have been noted in this review that may be seen in the context of reviewing the raw data.

## CERTIFICATE OF ANALYSIS

Service Location Project Lab ID Received HERITAGE LABORATORIES, INC. 30-NOV-93 A297725 7901 W. MORRIS ST. PO Number Complete INDIANAPOLIS, IN 46231 (317)243-8305 22-DEC-93 CI0325.001 Printed Sampled 23-DEC-93 29-NOV-93 13:10

Report To

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
SUITE 1000
35 E. WACKER DRIVE
CHICAGO, IL 60601

Bill To

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
35 E. WACKER DRIVE
CHICAGO, IL 60601

Sample Description

DESCRIPTION: MW-1

LOCATION: STACK PROPERTY - NORTH CHICAGO

Analyst: G. WILSON Analysis Date: 08-DEC-93 12:	2 Instrument:	GC/HS VOA	Test: 05	10.3.0
Parameter		Result	Det. Limit	Units
ACETONE	BDL		20	ug/L
BENZENE	BDL	٠	5::	ug/L
BROMODICHLOROMETHANE	BDL		5	ug/L
BROMOFORM	BDL		5	ug/L
BROMOMETHANE	BDL		10	ug/L
CARBON DISULFIDE	BDL		5	ug/L
CARBON TETRACHLORIDE	BDL		5	ug/L
CHLOROBENZENE	BDL		5	ug/L
CHLOROETHANE	BDL		10	ug/L
CHLOROFORM	BDL	the transfer of	5	
CHLOROMETHANE	BDL		10	ug/L
DIBROMOCHLOROMETHANE	BDL		5	ug/L
CIS-1,3-DICHLOROPROPENE	BDL		5	ug/L
1,1-DICHLOROETHANE	BDL		5.0	ug/L
1,2-DICHLOROETHANE	BDL		5	ug/L ug/L
1,1-DICHLOROETHENE	BDL		5.	ug/L
1.2-DICHLOROPROPANE	BDL		5	ug/L
ETHYL BENZENE	BDL		5	
2-HEXANONE	BDL		10	ug/L
DICHLOROMETHANE (METHYLENE CHLORIDE)	BOL		5	
METHYL ETHYL KETONE	BDL		10	ug/L
4-METHYL-2-PENTANONE	BDL			ug/L
STYRENE	BDL	· •	5	ug/L
	BDL		5	ug/L
1,1,2,2-TETRACHLOROETHANE	BDL	<i>y</i>	5	ug/L
TETRACHLOROETHENE	BDL	in the second second		ug/L
TOLUENE				
1,2-DICHLOROETHENE (CIS AND TRANS)	BDL		5	l ug/L
TRANS-1,3-DICHLOROPROPENE	BDL	h 4.	5	ug/L
1,1,1-TRICHLOROETHANE	BDL			ug/L
1,1,2-TRICHLOROETHANE	BDL			ug/L
TRICHLOROETHENE	BDL		5	ug/L
VINYL ACETATE	BDL			ug/L
VINYL CHLORIDE	BDL		10	ug/L
XYLENES (O/M/P-XYLENE)	BDL	Page 1 /a	5	ug/L

Page 1 (continued on next page)

HERITAGE LABURATURIES, INC.		Lab Sample ID: A297725
Parameter	Result	Det. Limit Units
SURROGATE RECOVERY		
DIGH ODGETHAN DA		
DICHLOROETHANE-D4 Toluene-D8	102 98	<b>3 Rec</b>
4-BROMOFLUOROBENZENE	104	% Rec
		N KCO
FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES ST Analysis Date: 02-DEC-93	1846-3005A	Test: P130.4.0
Perameter INITIAL WEIGHT OR VOLUME	Result 50	Pet. Limit Units
FINAL VOLUME	50	
ALUMINUM ICP SW846-6010A  Analysis H. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA DR 1CP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A	P130.4.0	Test; #101(3,8
Parameter ALUMINUM	Result	Det. Limit Units 0.050 mg/L
ANTIMONY ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF ADJECUS SAMPLES SW846-3005A  Parameter	P130,4.0 Result	Test: M102.3.9  Det. Limit Units
ANTIMONY	BDL	0.030 mg/L
Analyst: M. JAG Analysis Date: 06-DEC=93 08:00 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005A Parameter	A *	Test: N104.3.6
BARIUM	0.089	0.010 mg/L
BERYLLIUM ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test: #105.3.0
Parameter	Result	Det. Limit Units
BERYLLIUM	BDL	0.0050   mg/L
BORON ICP SW845-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Test: #107.3.0
BORON	Result 0.73	Det. Limit Units 0.050 mg/L
CALCIUM ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Test: #10923.0.
Perameter CALCIUM	Result 120	Det. Limit Units 0.20 mg/L
CHROMIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A	To the second	Text; #1925.0
Parameter CHROMIUM	Result BDL	Det. Limit Units 0.010 mg/L

Analyst: M. JAO Analysis Data: 06-DEC-93 08:00 In			
		Test: Mi	11.3.0
Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SUB46-3005A P	130.4.0		
COBALT	Result BDL	Det. Limit 0.010	units mg/L
COPPER ICP SW846-6010A  Analysts Date: 06-DEC-93 08:00 In  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P	1327 1 2	Testa: #	12.3.0
Parameter COPPER	Result 0.028	Det. Limit 0.020	Units mg/L
IRON ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 In  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A P		Teatr H	
Parameter IRON	Result BDL	Det. Limit 0.025	units mg/L
MAGNESIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 In  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P	•		18.3.0
Parameter MAGNESIUM	Result 32.	Det. Limit 0.20	Units mg/L
MANGANESE ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 II  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A P	· ·	Tents: H	119.3.0
Parameter MANGANESE	0.048	0.010	units mg/L
NICKEL ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 In  Prep: FAA OR ICP ACID DIGESTION OF AQUEQUE SAMPLES SW846-3005A P		Testa N	122.3.0
The state of the s			
Parameter	Result BDL	Det. Limit 0.010	Units mg/L
Parameter	BDL ICP		mg/L
Parameter NICKEL  POTASSIUM ICP SW846-6010A Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 II	BDL ICP	O.010 Tests N	mg/L
Parameter  NICKEL  POTASSIUM ICP SW846-6010A  Analyst: M. JAG Analysis Date: 06-DEC-93 08:00 II  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES \$4846-3005A P  Parameter	BDL  Instrument: ICP  130.4.0  Result  21.	Det. Limit 0.20	mg/L 126_3_0 Units
Parameter  NICKEL  POTASSIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 II  Prep: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES \$4846-3005A P  Parameter  POTASSIUM  SILVER ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 II  Prep: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES \$4846-3005A P  Parameter	BDL  Instrument: ICP  130.4.0  Result  21.	Det. Limit 0.20	mg/L  126_3_0  Units  mg/L
Parameter  NICKEL  POTASSIUM ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 II  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005A P  Parameter  POTASSIUM  SILVER ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 II  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005A P	BDL  Instrument: ICP  130.4.0  Result  21.  Instrument: ICP  130.4.0  Result  BDL	Det. Limit 0.20 Tests:N	mg/L  126_3_0  Units  mg/L

HERITAGE LABORATORIES, INC.		Lab Sample ID:	: A29//25
VANADIUM ICP SW846-6010A  Analysis Date: 06-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846		Test: N1	38.3.0
Parameter VANADIUM	Result BDL	Det. Limit 0.010	Units MQ/L
ZINC ICP SW846-6010A  Analysis Date: 06-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846		Tests H1	59.3.0
ZINC	Result 0.25	Det. Limit 0.020	units mg/L
GFAA ACID DIGESTION OF AQUEOUS SAMPLES SWI	846-3020A	Test: P130.6	LO.
INITIAL WEIGHT OR VOLUME FINAL VOLUME	Result 50 50	Det. Limit	Units mL mL
ARSENIC GFAA SW846-7060  Analyst: N. HEMMERLEIN Analysis Date: 20-DEC-93  Prep: GFAA ACID DIGESTION OF AGUEOUS SAMPLES SW846-3020A	Instrument: GFAA	Test> N103,2	13 <b>0</b> #
Parameter ARSENIC	Result BDL	Det. Limit 0.0050	Units mg/L
CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846	and the second s	Teet: N108:0	1.0
Pereneter CADMIUM	Result 0.0019	Det. Limit 0.0010	unita mg/L
LEAD TRACE ICP SW846-6010A  Analysis Date: 21-DEC-93  Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SW846		Test: H116.0	),6
Parameter	Result	Det. Limit	
LEAD	BDL	0.0050	unita mg/L
THALLIUM GFAA SW846-7841  Analysi: A. ROBERTSON Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A	Instrument: GFAA	1 * *	mg/L
THALLIUM GFAA SW846-7841 Anelysis A. ROBERTSON Anelysis Date: 12-DEC-93	Instrument: GFAA	0.0050	mq/L
Analyst: A. ROBERTSON Analysis Date: 12-DEC-93 Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A Parameter THALLIUM	Instrument: GFAA A P130.6.0  Result  BDL  Instrument: GFAA	0.0050 Test: N134.2	mg/L 2.0 Units mg/L
THALLIUM GFAA SW846-7841  Analyst: A. ROBERTSON Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A  Parameter  THALLIUM  1:4 DILUTION  SELENIUM GFAA SW846-7740  Analyst: A. ROBERTSON Analysis Date: 20-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A  Parameter	Instrument: GFAA A P130.6.0  Result  BDL  Instrument: GFAA	0.0050  Test: N134.2  Det. Limit 0.020	mg/L 2.0 Units mg/L 2.0 2.0
THALLIUM GFAA SW846-7841  Analyst: A. ROBERTSON Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A  Parameter  THALLIUM  1:4 DILUTION  SELENIUM GFAA SW846-7740  Analyst: A. ROBERTSON Analysis Date: 20-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A	Instrument: GFAA L P130.6.0  Result  BDL  Instrument: GFAA A P130.6.0  Result  BDL	0.0050  Test: N134.2  Det. Limit 0.020  Test: N128.2	mg/L  2.0  Units mg/L  2.0  Units mg/L

## HERITAGE LABORATORIES, INC.

Lab Sample ID: A297725

MERCURY CVAA SW84 Analyst: G. MAPP Prep: MERCURY CVAA ACT		STRUMENT: CVAA 70 P131.6.0	Test: M120.1	.0
MERCURY	Parameter	Result BDL	Det. Limit 0.00050	Units mg/L

Sample Comments

BDL Below Detection Limit

IDEM Drinking Water Certification Number C-49-01 This Certificate shall not be reproduced, except in full, without the written approval of the lab.

Quality Assurance Officer: CBBove

#### CERTIFICATE OF ANALYSIS

Service Location HERITAGE LABORATORIES, INC.	Received 30-NOV-93	Project	Lab ID A297726
7901 W. MORRIS ST. INDIANAPOLIS, IN 46231	Complete 22-DEC-93		Number 25.001
(317)243-8305	Printed 23-DEC-93		Pled -93 15:35

Report To

Bill To

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
SUITE 1000
35 E. WACKER DRIVE
CHICAGO, IL 60601

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
35 E. WACKER DRIVE
CHICAGO, IL 60601

Sample Description

DESCRIPTION: MW-3

LOCATION: STACK PROPERTY - NORTH CHICAGO

Analyst: G. WILSON Analysis Date: 08-DEC-93 13:40 Instrumen		GC/HS VOA	Test: 0510.3.0		
Parameter		Result	Det. Limit	Units	
ACETONE	BDL		20		
BENZENE	BDL		5	••••	
BROMODICHLOROMETHANE	BDL		5		
BROMOFORM	BDL	•	5		
BROMOMETHANE	BDL		10		
CARBON DISULFIDE	BDL	Andrew Commencer	5		
CARBON TETRACHLORIDE	BDL		5		
CHLOROBENZENE	BDL	4.64		ug/L	
CHLOROETHANE	BDL		10		
CHLOROFORM	BDL		5	ug/L	
CHLOROMETHANE	BDL		10		
DIBROMOCHLOROMETHANE	BDL		5	ug/L	
CIS-1,3-DICHLOROPROPENE	BDL		5	ug/L	
1,1-DICHLOROETHANE	BDL			ug/L	
1,2-DICHLOROETHANE	BDL		5	lug/L	
1,1-DICHLOROETHENE	47		- 5	ug/L	
1,2-DICHLOROPROPANE	BDL		) 5		
ETHYL BENZENE	BDL		5	ug/L	
2-HEXANONE	BDL		] 10		
DICHLOROMETHANE (METHYLENE CHLORIDE)	BDL		5	ug/L	
METHYL ETHYL KETÖNE	BDL		10	ug/L	
4-METHYL-2-PENTANONE	BDL		10	ug/L	
STYRENE	BDL		5		
1,1,2,2-TETRACHLOROETHANE	BDL	1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		ug/L	
TETRACHLOROETHENE	BDL		5		
TOLUENE	BDL			ug/L	
1,2-DICHLOROETHENE (CIS AND TRANS)	EST 5	700	5	ug/L	
TRANS-1,3-DICHLOROPROPENE	BDL			ug/L	
1,1,1-TRICHLOROETHANE	BDL		5		
1,1,2-TRICHLOROETHANE	BDL			ug/L	
TRICHLOROETHENE	110		5		
VINYL ACETATE	BDL	147 143 4.4 .48.	10	l ug/L	
VINYL CHLORIDE	EST 1	1400	10		
XYLENES (O/M/P-XYLENE)	BOL			ug/L	

Page 1 (continued on next page)

Parameter	Result	Det. Limit	Units
SURROGATE RECOVERY		trinit	
DICHLOROETHANE-D4 TOLUENE-D8	102 96	77 Y	% Rec % Rec
4-BROMOFLUOROBENZENE Dilution necessary due to high concentr	107		% Rec

OLATILE ORGANICS SW846-8240A Analyst: G. WILSON Analysis Date: 10-DEC-93 14:	44 Instrument: GC/	AOV ZH	Test: 05	510.3.1
Parameter		esult	Det. Limit	Units
CETONE	BDL		2000	ug/L
ENZENE	BDL	. •	500	
ROMODICHLOROMETHANE	BDL		500	ug/L
ROMOFORM	BDL		500	ug/L
ROMOMETHANE	BDL	* * *.	1000	ug/L
ARBON DISULFIDE	BDL		500	
ARBON TETRACHLORIDE	BDL		500	
HLOROBENZENE	BOL		500	ug/L ug/L
				ug/L
HLOROETHANE	BDL		1000	ug/L
HLOROFORM	BDL		500	ug/L
HLOROMETHANE	BDL		1000	ug/L
IBROMOCHLOROMETHANE	BDL	•	500	
IS-1,3-DICHLOROPROPENE	BDL		500	ug/L
, 1-DICHLOROETHANE	BDL	1.14	500	1 .
,2-DICHLOROETHANE	BDL		500	ug/L
,1-DICHLOROETHENE	BDL	* . **		ug/L
,2-DICHLOROPROPANE	BDL		500	ug/L
THYL BENZENE	BDL		500	ug/L
-HEXANONE	BDL		1000	1 110/1
ICHLOROMETHANE (METHYLENE CHLORIDE)	BDL		500	ug/L
ETHYL ETHYL KETÖNE	BDL		1000	ug/L
-METHYL-2-PENTANONE	BDL		1000	
TYRENE	BDL		500	ug/L
,1,2,2-TETRACHLOROETHANE	BDL		500	
ETRACHLOROETHENE	BDL		500	ug/L
OLUENE	BDL		500	
,2-DICHLOROETHENE (CIS AND TRANS)	13000		500	ug/L
RANS-1,3-DICHLOROPROPENE	BDL		500	
	BDL		500	ug/L
,1,1-TRICHLOROETHANE	1		500	ug/L
,1,2-TRICHLOROETHANE	BDL			
RICHLOROETHENE	BDL		500	ug/L ug/L
INYL ACETATE	BDL		1000	ug/L
INYL CHLORIDE	1000		1000	ug/L
YLENES (O/M/P-XYLENE)	BDL		500	ug/L
 URROGATE RECOVERY	T <sub>H</sub>	eren konere sener 1 och MARIL		
TOU ODDETUANT DA	105	entre de production	ji mji najvejejeve	% Rec
ICHLOROETHANE-D4	105		The second of th	% Rec
OLUENE-D8	95	1. July 1. 1.	tym a troat ar ar maggyr	% Rec
I-BROMOFLUOROBENZENE	106		- F 5 - H - H - T - T	→ K6C

HERITAGE LABORATORIES, INC.		Lab Sample ID:	: A297726
FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLE Analyst: E. MERRILL Analysis Date: 02-DEC-93	S SW846-3005A	Test: P130.4	.0
Parameter INITIAL WEIGHT OR VOLUME INAL VOLUME	Result 50 50	Det. Limit	Units mL mL
ALUMINUM ICP SW846-6010A  Analyst: N. JAO Analysts Date: 06-DEC-93 08  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3		Testy:N1	01.3.0
Peremeter ALUMINUM	Result BDL	Det. Limit 0.050	Units MQ/Ĺ
ANTIMONY ICP SW846-6010A  Analyst: M. JAG Analysis Date: 06-DEC-93 08  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3			02.3.0
Parameter ANTIMONY	Result BDL	Det. Limit 0.030	Units mg/L
BARIUM ICP SW846-6010A  Analyst: M. JAO  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3		Test: #1	04.3.a
Perameter BARIUM	Result 0.069	Det. Limit 0.010	Units mg/L
BERYLLIUM ICP SW846-6010A  Analyst: H. JAO Analysis Date: 06-DEC-93 08  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3		Test: Mi	105.3.0
Perameter BERYLLIUM	Result BDL	Det. Limit 0.0050	Units Mg/L
BORON ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3		Tests M	107.3.0
Parameter BORON	Result 4.1	Det. Limit 0.050	Units mg/L
CALCIUM ICP SW846-6010A  Analysis M. JAO  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-		Test: N	109.3.0
Parameter CALCIUM	Result 100	Det. Limit 0.20	Units mg/L

CALCIUM	100	0.20	mq/L
CHROMIUM ICP SW846-6010A  Analyst: H. JAO  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW	93 08:00 Instrument: 1CP '	Tests: II	110-3,0
Parameter CHROMIUM	Result BDL	Det. Limit 0.010	units mg/L
COBALT ICP SW846-6010A	07.00.00. Inches	7.444	111 1 0

Analyst: H. JAO Prep: FAA OR ICP	Analysis Date: 06-DEC- ACID DIGESTION OF AGUEGUS SAMPLES SI	-93 08:00 Instrument: ICP W846-3005A P130.4.0	Tests M	11.3.0
COBALT	Parameter	Result BDL	Det. Limit 0.010	units mq/L

Analyst: M. JAO Analysis Date: 06-DEC-93 Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW8	3 08:00   Instrument:   ICP 46-3005A P130.4.0	Test: H	112.3.0
Parameter COPPER	Result BDL	Det. Limit 0.020	units mg/L
IRON ICP SW846-6010A  Analysis Date: 06-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW8	3 08:00   Instrument: ICP		115.3.0
Perameter IRON	Result BDL	Det. Limit 0.025	units mg/L
MAGNESIUM ICP SW846-6010A  Analysis Date: 06-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW8		Test: N	118:3.0
Pereneter MAGNESIUM	Result 45.	Det. Limit 0.20	units mg/L
MANGANESE ICP SW846-6010A  Analysis Date: 06-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW8	3 08:00 Instrument: ICP	•	119.3.0
Perameter MANGANESE	0.019	Det. Limit 0.010	Units mg/L
NICKEL ICP SW846-6010A  Analysis Date: 06-DEC-93  Prep: FAA OR 1CP ACID DIGESTION OF AGUEOUS SAMPLES SW8	3 08:00 Instrument: ICP	Test: M	122.3.0
Parameter NICKEL	Result BDL	Det. Limit 0.010	Units mg/L
Parameter NICKEL POTASSIUM ICP SW846-6010A	BDL Result BDL 3 08:00 Instrument: ICP		mg/L
Parameter NICKEL POTASSIUM ICP SW846-6010A Analyst: M. JAO Analysis Date: 06-DEC-9	BDL Result BDL 3 08:00 Instrument: ICP	0.010 Testa M	mg/L
Parameter NICKEL  POTASSIUM ICP SW846-6010A Analyst: M. JAO Analysis Date: 06-DEC-9: Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW8 Parameter POTASSIUM  SILVER ICP SW846-6010A	80L  3 08:00 Instrument: ICP 46-3005A P130.4.0  Result 4.7	O.010 Test: N Det. Limit O.20	mg/L 126,3,6
Parameter  NICKEL  POTASSIUM ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-9: Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW8  Parameter  POTASSIUM  SILVER ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-9:	80L  3 08:00 Instrument: ICP 46-3005A P130.4.0  Result 4.7	Det. Limit 0.20 Test: M	mg/L 126.3.0 Units mg/L
Parameter  NICKEL  POTASSIUM ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-9: Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW8  Parameter  POTASSIUM  SILVER ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-9: Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW8  Parameter  SILVER  SODIUM ICP SW846-6010A	80L  808:00 Instrument: ICP  46-3005A P130.4.0  Result  4.7  8 08:00 Instrument: ICP  46-3005A P130.4.0  Result  BDL	Det. Limit 0.20 Test: M Det. Limit 0.20	mg/L  126,3.0  Units  mg/L  130,3.0  Units

VANADIUM

Det. Limit

Result

BDL

Units

0.010 mg/L

HERITAGE LABORATORIES, INC.	La	b Sample ID	: A297726
ZINC ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Inst		Test: N	139.3.0
Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SUB46-3005A P13	0.4.0		
ZINC	Result BDL	Det. Limit 0.020	Units mg/L
GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020 Analysis Date: 07-DEC-93	DA	Test: <b>P136.</b> (	5.6
INITIAL WEIGHT OR VOLUME FINAL VOLUME	Result 50 50	Det. Limit	Unite ML ML
ARSENIC GFAA SW846-7060 Analysis N. HEMMERLEIN Analysis Date: 20-DEC-93 Instrum Prep: GFAA ACID DIGESTION OF AQUEDUS SAMPLES SW846-3020A P130.6.0	ent: GFAA	Test: M105	2.0"
Parameter ARSENIC	Result BDL	Det. Limit 0.0050	units mg/L
CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93 Instrum Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P130	ent: 1CP 0.4.0	Test: M106.(	) <b>.B</b>
CADMIUM Parameter	Result BDL	0.0010	Units mg/L
LEAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93 Instrum  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A P13	ent: ICP 0.4.0	Test: M116.	1.0
Parameter LEAD	Result BDL	Det. Limit 0.0050	units mg/L
THALLIUM GFAA SW846~7841  Analyst: A. ROBERTSON Analysis Date: 12-DEC-93 Instrum Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0	ent: GFAA	Test: N134.	232
Parameter THALLIUM	Result BDL	Det. Limit 0.020	units mg/L
1:4 DILUTION			
SELENIUM GFAA SW846-7740 Analysis Date: 20-DEC-93 Instrum Prep: GFAA ACID DIGESTION OF AGUEOUS SAMPLES SW846-3020A P130.6.0	ent: GFAA	Test: N125.	2.0
Parameter SELENIUM	Result BDL	Det. Limit 0.0050	Units mq/L
MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMPLES SH Analyst: G. MAPP Analysis Date: 01-DEC-93	1846-7470	Test: P131.	6,9
Persector INITIAL WEIGHT OR VOLUME FINAL VOLUME	100 100	Det. Limit	Units ML ML
MERCURY CVAA SW846-7470  Analyst: G. MAPP Analysis Date: 07-DEC:93 Instrum Prep: MERCURY CVAA ACID DIGESTION OF AGUEOUS SAMPLES SW846-7470 P1	ent: CYAA 31.6.0	Testr: #120;	135
Parameter MERCURY	Result	Det. Limit 0.00050	Units mg/L

Sample Comments

BDL Below Detection Limit

EST Estimated Value

IDEM Drinking Water Certification Number C-49-01 This Certificate shall not be reproduced, except in full, without the written approval of the lab.

Quality Assurance Officer:

Page 6 (last page)

#### CERTIFICATE OF ANALYSIS

Service Location HERITAGE LABORATORIES, INC.	Received 30-NOV-93	Project	Lab 10 A297727
7901 W. MORRIS ST. INDIANAPOLIS, IN 46231	Complete 22-DEC-93	PO Num C I 0 3 2 5	ber
(317)243-8305	Printed 23-DEC-93	29-NOV-93	<del>-</del>

Report To

GARY CIPRIANO GERAGHTY & MILLER, INC., SUITE 1000 35 E. WACKER DRIVE CHICAGO, IL 60601

GARY CIPRIANO GERAGHTY & MILLER, INC., 35 E. WACKER DRIVE CHICAGO, IL 60601

Bill To

Sample Description

DESCRIPTION: GMMW-1

LOCATION: STACK PROPERTY - NORTH CHICAGO

VOLATILE ORGANICS SW846-8240A Analysis Date: 09-DEC-93 12:44 Instrument: GC/MS VOA		Test: 0510.3.0		
Parameter		Result	Det. Limit	Units
CETONE	8DL		20	ug/L
ENZENE	BDL		5	ug/L
ROMODICHLOROMETHANE	BDL		5	ug/L
ROMOFORM	BDL		5	ug/L
ROMOMETHANE	BDL		10	ug/L
ARBON DISULFIDE	BDL	•	5	ug/L
ARBON TETRACHLORIDE	BDL		5	ug/L
HLOROBENZENE	BDL		5	ug/L
HLOROETHANE	BDL		10	ug/L
HLOROFORM	BDL	. • • •	5	ug/L
HLOROMETHANE	BDL		10	ug/L
IBROMOCHLOROMETHANE	BDL		5	ug/L
IS-1,3-DICHLOROPROPENE	BDL		5	ug/L
.1-DICHLOROETHANE	BDL		5::	ug/L
,2-DICHLOROETHANE	BDL		5	ug/L
.1-DICHLOROETHENE	BDL		5	ug/L
.2-DICHLOROPROPANE	BDL		5	ug/L
THYL BENZENE	BDL		5:	ug/L
-HEXANONE	BDL		10	ug/L
ICHLOROMETHANE (METHYLENE CHLORIDE)	BDL		14 Har A 5	
ETHYL ETHYL KETONE	BDL		10	ug/L
-METHYL-2-PENTANONE	BDL	man i	10	
TYRENE	BDL		5	ug/L
,1,2,2-TETRACHLOROETHANE	BDL			ug/L
ETRACHLOROETHENE	BDL		5	ug/L
OLUENE	BDL			ug/L
.2-DICHLOROETHENE (CIS AND TRANS)	BDL		5	ug/L
RANS-1,3-DICHLOROPROPENE	BDL		5	ug/L
.1.1-TRICHLOROETHANE	BDL		5	ug/L
1.2-TRICHLOROETHANE	BDL			ug/L
RICHLOROETHENE	BDL		5	ug/L
VINYL ACETATE	BDL			ug/L
VINYL CHLORIDE	BDL		10	ug/L
(YLENES (O/M/P-XYLENE)	BDL			ug/L

Page 1 (continued on next page)

Parameter	Result	Det. Limit	Units mg/L
CHROMIUM	BDL	0.010	
Analyst: M. JAO Analysis Date: 06-DEC-93 08 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3		Testa	10.3.0

CHROMIUM ICP SURAK-KOIDA

~~ 37483338 j. 4 ~

HERITAGE LABORATORIES, INC.		
COBALT ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		O.E.fft# steeT
COBALT	Result BDL	Det. Limit Units 0.010 mg/L
COPPER ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test: #112.3.0
COPPER	Result BDL	Det. Limit Units 0.020 mg/L
IRON ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW86-3005A		Test: N11525.0
Perameter IRON	Result 0.49	Det. Limit Units 0.025 mg/L
MAGNESIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Tests #118:3:0
Parameter MAGNESIUM	Result 76.	Det. Limit Units 0.20 mg/L
MANGANESE ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test: #19.3.0
Perameter MANGANESE	Result 0.065	Det. Limit Units 0.010 mg/L
NICKEL ICP SW846-6010A Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test: #122.3,0
Parameter NICKEL	Result BDL	Det. Limit Units 0.010 mg/L
POTASSIUM ICP SW846-6010A  Analyst: M. JAC Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Test: #126.3.0
Parameter POTASSIUM	Result 3.3	Det. Limit Units 0.20 mg/L
SILVER ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A	Institution: ICP	Test: #130,3.8
Parameter SILVER	Result BDL	Det. Limit Units 0.010 mg/L
SODIUM ICP SW846-6010A  Analyst: M. JAD Analysis Date: 06-DEC-93 08:00  Prop: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A	10 TWY	Teats:#137,3.0
Parameter SODIUM	Result 19.	Det. Limit Units 0.20 mg/L

HERITAGE LABORATORIES, INC.		Lab Sample ID: A297727
VANADIUM ICP SW846-6010A  Analyst: M. JAO  Analysis Date: 06-DEC-93 08:0  Prep: FAA OR ICP ACID DIGESTION OF ADUEOUS SAMPLES SW846-30		Test: M138.3.0
Parameter VANADIUM	Result BDL	Det. Limit Units 0.010 mg/L
ZINC ICP SW846~6010A  Analysis Date: 06-DEC-93 08:  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30		Test: N139.3.0
ZINC Peremeter	Result 0.021	Det. Limit Units 0.020 mg/L
GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846 Analyst: R. BYERS Analysis Date: 07-DEC-93	5-3020A	Test: P130.6.0
Parameter INITIAL WEIGHT OR VOLUME FINAL VOLUME	50 50	Det. Limit Units mL
ARSENIC GFAA SW846-7060  Analyst: N. HEMMERLEIN Analysis Date: 20-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P1	Instrument: GFAA 30.6.0	Test: M103.2.0
Parameter ARSENIC	Result BDL	Det. Limit Units 0.0050 mg/L
CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-30	Instrument: ICP 05A P130.4.0	Test: H108.0.0
CADMIUM Parameter	Result BDL	Det. Limit Units 0.0010 mg/L
LEAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30	Instrument: ICP 105A P130,4.0	Test: M116.0.0.5
Parameter LEAD	Result BDL	Det. Limit Units 0.0050 mg/L
THALLIUM GFAA SW846-7841  Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P1	Instrument: GFAA 30.6.0	Test: N134.2.0:
THALLIUM 1:4 DILUTION	Result BDL	Det. Limit Units 0.020 mg/L
SELENIUM GFAA SW846-7740 Analyst: A. ROBERTSON Analysis Date: 20-DEC-93 Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P1	Instrument: GFAA	Test: H128.2.0
Parameter SELENIUM	Result BDL	Det. Limit Units 0.0050 mg/L
MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMP	LES SW846-7470	Tests: P131:6:0
INITIAL WEIGHT OR VOLUME FINAL VOLUME	100 100	Det. Limit Units 和L

Lab Sample ID: A297727

MERCURY CYAA SW84 Analyst: G. MAPP Prep: MERCURY CYAA ACI		Instrument: CVAA 6-7470 P131.6.0	Test: M120_1	I <b>.0</b>
MERCURY	Parameter	Result BDL	Det. Limit 0.00050	Units mg/L

Sample Comments

BDL Below Detection Limit

IDEM Drinking Water Certification Number C-49-01 This Certificate shall not be reproduced, except in full, without the written approval of the lab.

Quality Assurance Officer:

Service Location	Received	Project	Lab ID
HERITAGE LABORATORIES, INC.	_30-NOV-93		A297729
7901 W. MORRIS ST.	Complete	PO N	umber
INDIANAPOLIS, IN 46231	22-DEC-93	C1032	5.001
(317)243-8305	Printed	See	led
	23-DEC-93	29-NOV-	93 09:40

Report To

Bill To

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
SUITE 1000
35 E. WACKER DRIVE
CHICAGO, IL 60601

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
35 E. WACKER DRIVE
CHICAGO, IL 60601

Sample Description

DESCRIPTION: GMMW-2

LOCATION: STACK PROPERTY - NORTH CHICAGO

Analyst: G. WILSON Analysis Date: 08-	-DEC-93 16:06 Inst	rument: 0	C/HS VOA		Test: 05	10.3.0
Parameter			Result	Det.	Limit	Units
ACETONE		BDL	erre summan.	ļ	20	ug/L
BENZENE		BDL			5	ug/L
BROMODICHLOROMETHANE	,	BDL			5	ug/L
BROMOFORM	;	BDL		1	5	ug/L
BROMOMETHANE		BDL			10	ug/L
CARBON DISULFIDE		BDL			5	ug/L
CARBON TETRACHLORIDE		BDL		1	5	ug/L
CHLOROBENZENE		BOL	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		5	ug/L
CHLOROETHANE		BDL		ł	10	ug/L
CHLOROFORM		BDL		1	5:3	ug/L
CHLOROMETHANE		BDL	•		10	ug/L
DIBROMOCHLOROMETHANE		BDL			5	ug/L
CIS-1,3-DICHLOROPROPENE		BDL		1	5	ug/L
1,1-DICHLOROETHANE		BDL			.5	ug/L
1,2-DICHLOROETHANE		BDL		1	5	ug/L
1,1-DICHLOROETHENE		BDL		1	5	ug/L
1,2-DICHLOROPROPANE		BDL			5	ug/L
ETHYL BENZENE		BDL	mai wali wali wali	ŀ	5	ug/L
2-HEXANONE	•	BDL	· · · · · · · · · · · · · · · · · · ·	f	10	ug/L
		BDL	and the same and the	. Legitur	5	
DICHLOROMETHANE (METHYLENE CHLORIDE)	).	BDL	e to the same to the	Again a	10	ug/L
METHYL ETHYL KETONE			to the advancer of the	1		
4-METHYL-2-PENTANONE	ericki kirininger (f	BDL		1.00		ug/L
STYRENE		BDL	A 1 9 10 10 10 10 10 10 10 10 10 10 10 10 10	y www.j	5	ug/L
1,1,2,2-TETRACHLOROETHANE		BDL		11111111	5	
TETRACHLOROETHENE		BDL		1	5	ug/L
TOLUENE		BDL		100	5	
1,2-DICHLOROETHENE (CIS AND TRANS)		23			5	ug/L
TRANS-1,3-DICHLOROPROPENE	- 1	BDL	d Maria	A MARKET	5	
1,1,1-TRICHLOROETHANE		BDL		l,	5	ug/L
1,1,2-TRICHLOROETHANE		BOL			5	T
TRICHLOROETHENE		BDL		<u>.]</u>	5	l ug/L
VINYL ACETATE		BDL	100 (100 (100 (100 (100 (100 (100 (100			ug/L
VINYL CHLORIDE		BDL			10	ug/L
XYLENES (O/M/P-XYLENE)	een jaartii maan A	BDL	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		5	ug/L

Page 1 (continued on-next page)

HERITAGE LABORATORIES, INC.			Lai	b Sample II	: A297729
Parameter	T	Result		Det. Limit	Units
SURROGATE RECOVERY					:::···································
DICHLOROETHANE-D4 TOLUENE-D8 4-BROMOFLUOROBENZENE	99 98 103			ntare ( thyth, a Lae ( cetael) 194	% Rec % Rec % Rec
FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW8		A			
Analyst: E. MERRILL Analysis Date: 02-DEC-93  Persector	<del></del>	Result	<del></del>	Test: P130.	Units
INITIAL WEIGHT OR VOLUME FINAL VOLUME	50 50	j. 11 (A.	i film fram na		mL mL
ALUNINUM ICP SW845-6010A  Analysis Date: 06-DEC-93 08:00 Inc  Prop: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P1		ICPAN ( ) S		. Testz: A	101.3.0
Perameter ALUMINUM	BDL	Result		Det. Limit 0.050	Units mg/L
ANTIMONY ICP SW846-6010A Analyst: N. JAC Analysis Date: 06-DEC-93 08:00 Ins Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES \$1846-3005A P1:		ICP		Testr H	102.3.0
Parameter ANT I MONY	BDL	Result		Det. Limit 0.030	Units mg/L
BARIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 : In: Prop: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P1		I <b>CP</b>		Tésta: N	104.3.0
Parameter BARIUM	0.12	Result		Det. Limit 0.010	Units mg/L
BERYLLIUM ICP SW846-6010A  Analyst: M. JAO  Analysis Date: 06-DEC-93 08:00 Inc  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P1		ICP.		Test: X	105.3.0
Parameter BERYLLIUM	BDL	Result		Det. Limit 0.0050	Units mg/L
BORON ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Insert Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P1		1 <b>CP</b>		Test2-F	0.5.7011
Persecter BORON	1.5	Result		Det. Limit 0.050	Units mg/L
CALCIUM ICP SW846-6010A Analyst: N. JAO Analysis Date: 06-DEC-93 08:00 In Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SU846-3005A PI		ICP		Teat; I	1109:31.0
Persmeter CALCIUM	130	Result		Det. Limit 0.20	units mg/L
CHROMIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 In  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P1		ice		Ţusta:	(110:3:0
Perameter CHROMIUM	BDL	Result		Det. Limit 0.010	Units mg/L

COBALT ICP SW846-6010A ANALYSEE N. JOD ANALYSEE N. JOD PROD: FAX OR ICP ACID DIGESTION OF ADMOUS SAMPLES SW846-3005A P130.4.0  COBALT  Parameter  BDL Result Dat. Limit O.010 mg/L  COPPER ICP SW846-6010A ANALYSEE N. JADO ANALYSE	HERITAGE LABORATORIES, INC.		Lab Sample ID: A297729
COPPER ICP SM846-6010A Analyses A. JAD. Analyses Date: 06-DEC-93 08:00 Instrument: ICP Perper IA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SM866-3005A P130.4.0  IRON ICP SM846-6010A Analyses A. JAD. Analyses Date: 06-DEC-93 08:00 Instrument: ICP Perper IA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SM866-3005A P130.4.0  IRON ICP SM846-6010A Analyses A. JAD. Analyses Date: 06-DEC-93 08:00 Instrument: ICP Perper IA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SM866-3005A P130.4.0  Perper IA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SM866-3005A P130.4.0  Perper IA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SM866-3005A P130.4.0  Parameter  Parameter  Parameter  Parameter  Parameter  So. Result  Det. Limit Units O.20 mg/L  MANGANESE ICP SM846-6010A Analyses A. JAD Analyse	Analyst: M. JAO Analysis Date: 06-DEC-93 08:D		Test: #111.3.0
ANALYSEE M. JAD ANALYSE DATE: GO-DEC-73 08:00 Instrument: ICP Test: M12.3.0  PROPER ALOR ICP ACID DIGETION OF AGUECUS SAMPLES SAMPAGE SAMPAGE SAMPAGE SAMPAGE SAMPAGE MISS. A.O.  REMULT DET. MISS. MI			
IRON ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M115.3.0  Perpo: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  IRON Perpo: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  IRON Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  MANGANESIUM Parameter Parameter So. Result Det. Limit Dutt. Limit NICKEL DUTT. MANGANESE SW846-6010A Analysis M. JAO Analysis M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M122.3.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  Parameter BDL Det. Limit Dutt. Limit Dutter SILVER BDL Det. Limit Dutt. Limit Dutter SILVER BDL Det. Limit Dutter Dutt. Limit Dutter Dutt. Limit Dutter Dutt. Limit Dutter Dutter M126.3.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SAMPLES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SW84ES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SW84ES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION OF AGREGUS SW84ES SW846-3005A P130.4.0  Prop: FAA OR ICP ACID DIGESTION O	Analyst: M. JAO Analysis Date: 06-DEC-93 08:0		Yest2:N117,3,0
INALYSE: M. JAO Prep: FAA OR ICP ACID DIGESTION OF ACURCUS SAMPLES SM846-3005A P130.4.0  Persumeter    1.3	·	,,,	
HAGNESIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Persenance  MAGNESIUM Parameter  MAGNESIUM Parameter  MAGNESIUM Parameter  MAGNESIUM Parameter  MAGNESIUM Parameter  MAGNESIUM Parameter  MARGNESIUM SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Analysis: M. JAD Analysis Date: 06-DEC-93 08:00 Instrument: ICP Analysis: M. JAD Analysis Date: 06-DEC-93 08:00 Instrument: ICP NICKEL ICP SW846-6010A Analysis M. JAD Analysis Date: 06-DEC-93 08:00 Instrument: ICP NICKEL ICP SW846-6010A Analysis M. JAD Analysis Date: 06-DEC-93 08:00 Instrument: ICP NICKEL  Parameter  MOTASSIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP NICKEL  POTASSIUM ICP SW846-6010A Analysis M. JAD Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: MIZZ.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P130.4.0  PARAMETER Date: MIZA.3.0  PROTASSIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: MIZA.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P130.4.0  PARAMETER Date: MIZA.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P130.4.0  PRESENTANCE  PARAMETER BDL  Date: Limit Units O.20 mg/L  SILVER ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: MIZA.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P130.4.0  PARAMETER BDL  Date: Limit Units O.20 mg/L  Test: MIZA.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P130.4.0  PARAMETER BDL  Date: Limit Units O.20 mg/L	Analyst: M. JAO Analysis Date: 06-DEC-93 08:0	O Instrument: ICP	Test: M115,3.0
Analysis Date: 06-DEC-93 08:00 Instrument: ICP Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SM846-3005A P130.4.0  Parameter  MAGNESIUM  MAGNESIUM  Parameter  MAGNESIUM  M			
MANGANESE ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M192.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A P130.4.0  MICKEL ICP SW846-6010A Analysis M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M122.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A P130.4.0  Parameter BDL Result Det. Limit Units 0.010 mg/L  POTASSIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M122.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A P130.4.0  POTASSIUM ICP SW846-6010A Analysis M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M126.3.0  Perp: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A P130.4.0  Parameter BDL Det. Limit Units 0.20 mg/L  SILVER ICP SW846-6010A Analysis M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M130.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A P130.4.0  Parameter BDL Det. Limit Units 0.010 mg/L  SILVER Det. Limit Units O.010 mg/L  SODIUM ICP SW846-6010A Analysis M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M135.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A P130.4.0  Parameter BDL Det. Limit Units U	Analyst: M. JAO Analysis Date: 06-DEC-93 08:0	O Instrument: ICP	Test: N118.3.0
Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Prep: FAA OR ICP ACID DIGESTION OF AGUECUS SAMPLES SUB46-3005A P130.4.0  MANGANESE Parameter O. 25 Det. Limit O.010 mg/L  MICKEL ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M122.3.0  Prep: FAA OR ICP ACID DIGESTION OF AGUECUS SAMPLES SUB46-3005A P130.4.0  Parameter BDL Result O.010 mg/L  POTASSIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M126.3.0  Prep: FAA OR ICP ACID DIGESTION OF AGUECUS SAMPLES SW846-3005A P130.4.0  Parameter BDL Result Det. Limit Units O.20 mg/L  SILVER ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M130.3.0  Parameter BDL Det. Limit Units O.20 mg/L  SILVER ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M130.3.0  Parameter BDL Det. Limit O.010 mg/L  SILVER SILVER BDL Det. Limit O.010 mg/L  SODIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M135.3.0  Parameter BDL Det. Limit O.010 mg/L  SODIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M135.3.0  Parameter BDL Det. Limit O.010 mg/L  SODIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M135.3.0  Parameter BDL Det. Limit O.010 mg/L  SODIUM ICP SW846-6010A Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M135.3.0  Perp: FAA OR ICP ACID DIGESTION OF AGUECUS SAMPLES SW846-3005A P130.4.0		1	1 1
MANGANESE 0.25 0.010 mg/L  NICKEL ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Instrument: ICP  Peremeter BDL  POTASSIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Instrument: ICP  Potassium ICP SW846-6010A  Analysis N. JAO  Analysis Date: 06-DEC-93 08:00 Instrument: ICP  Peremeter Result Det. Limit Units mg/L  POTASSIUM  Peremeter Result Det. Limit Units  POTASSIUM  Peremeter Result Det. Limit Units  NICKEL Det. Limit Units  POTASSIUM  SILVER ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Instrument: ICP  Test: M126.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEQUS SAMPLES SW846-3005A P130.4.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEQUS SAMPLES SW846-3005A P130.4.0  Peremeter BDL  SODIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Instrument: ICP  Test: M130.3.0  Peremeter BDL  Test: M1352.3.0  Peremeter Result Det. Limit Units  O.010 mg/L  Test: M1352.3.0	Analyst: M. JAO Analysis Date: 06-DEC-93 08:0	1 1 4 15 m	Tent: N119.3.0
Analyst: M. JAO Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SUBA6-3005A P130.4.0  Parameter    Result   Det. Limit   Units			
POTASSIUM ICP SW846-6010A Anelyst: M. JAO Anelysis Date: 06-DEC-93 08:00 Instrument: ICP Test: N126.3.0  POTASSIUM ICP SW846-6010A Anelyst: M. JAO Anelysis Date: 06-DEC-93 08:00 Instrument: ICP Test: N126.3.0  Parameter Result Det. Limit Units 0.20 mg/L  SILVER ICP SW846-6010A Anelyst: M. JAO Anelysis Date: 06-DEC-93 08:00 Instrument: ICP Test: N130.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005A P130.4.0  Parameter BDL Det. Limit Units SILVER SILVER BDL Det. Limit Units For Det. Limit Units SILVER BDL Det. Limit Units Anelyst: M. JAO Anelysis Date: 06-DEC-93 08:00 Instrument: ICP Test: N131.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005A P130.4.0	Analyst: M. JAO Analysis Date: 06-DEC-93 08:0	O Instrument: ICP	Tests N122:3,0
Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Text: N126.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES \$W846-3005A P130.4.0  Parameter Result Det. Limit Units DOTASSIUM 18. 0.20 mg/L  SILVER ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: N130.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES \$W846-3005A P130.4.0  Parameter Result Det. Limit Units SILVER  SODIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00 Instrument: ICP Text: N133.3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES \$W846-3005A P130.4.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES \$W846-3005A P130.4.0  Parameter Result Det. Limit Units Units Units Units DOTAGE OF AQUEOUS SAMPLES \$W846-3005A P130.4.0		Result	
POTASSIUM  SILVER ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: 1CP Test: M130:3.0  Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005A P130.4.0  Parameter Result Det. Limit Units SILVER  SODIUM ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M131:3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005A P130.4.0  Parameter Result Det. Limit Units	Analyst: N. JAO Analysis Date: 06-DEC-93 08:0		Tests: N126.3.0
Analyst: H. JAO Analysis Date: 06-DEC-93 08:00 Instrument: 1CP Test: M13G.3.0  Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES \$U846-3005A P130.4.0  Parameter Result Det. Limit Units SILVER BDL 0.010 mg/L  SODIUM ICP SW846-6010A  Analyst: H. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICP Test: M133:3.0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES \$U846-3005A P130.4.0  Parameter Result Det. Limit Units		,	, ,
SILVER  SODIUM ICP SW846-6010A  Analysis H. JAO Analysis Date: 06-DEC-93 08:DO Instrument: ICP Teats M131.3.0.  Prop: FAA OR ICP ACID DIGESTION OF ARLEQUS SAMPLES SW846-3005A P130.4.0  Parameter Result Det. Limit Units	Analyst: M. JAD Analysis Date: 06-DEC-93 08:0		Testx N130.3.0
Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Instrument: ICF Test::M135.3.0  Prep: FAA OR ICP ACID DIGESTION OF AGUECUS SAMPLES SUB46-3005A P130.4.0  Parameter Result Det. Limit Units			
1	Anelyst: H. JAO Anelysis Date: 06-DEC-93 08:1	The second of th	Tests: M31:3.0
SODIUM 71. 0.20 mg/L	SODIUM Parameter	Result 71.	Det. Limit Units 0.20 mg/L

VANADIUM ICP SW846-6010A			b Sample ID	
Analyst: M. JAG Analysis Data: 06-DEC-93 08:00 Ins Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES \$1846-3005A P13		<b>:</b> P	Teetr H	138.3.0
Parameter VANADIUM	BDL	Result	Det. Limit 0.010	Units Mg/L
ZINC ICP SW846-6010A  Analyst: H. JAO Analysis Date: 06-DEC-93 08:00 Ins  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P13		TP	Tests N	159.3.0
Parameter ZINC	0.046	Result	Det. Limit 0.020	units mg/L
GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020 Analysis Date: 07-DEC-93	)A		Tests P1302	
Parameter INITIAL WEIGHT OR VOLUME	50	Result	Det. Limit	Units mL
FINAL VOLUME	50			mL
ARSENIC GFAA SW846-7060  Analyst: N. HEMMERLEIN Analysis Date: 20-DEC-93 Instrum Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0	ment: GFAA		Test: M103.2	The Control of the Co
Parameter ARSENIC	BDL	Result	Det. Limit 0.0050	Units mg/l
Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P13				
Parameter CADMIUM	BDL	Result	0.0010	Units
LEAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93 Instrum Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A P13	<del>~</del>		Test: H116.	
LEAD Parameter	BDL	Result	Det. Limit 0.0050	mg/L
THALLIUM GFAA SW846-7841	ment: GFAA	· · · · · · · · · · · · · · · · · · ·	Tests M134.	2.0 % 
Analyst: A. ROBERTSON Analysis Date: 12-DEC-93 Instrum Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0	_		1 1 1 1 1 1	Units
Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0  Peremeter THALLIUM	BDL	Result	0.010	mg/L
Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0  Perameter  THALLIUM  1:2 DILUTION  SELENIUM GFAA SW846-7740  Analyst: A. ROBERTSON Analysis Data: 20-DEC-93 Instrum  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0  Perameter	ment: GFAA	Result		Z.O
Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0  Parameter  THALLIUM  1:2 DILUTION  SELENIUM GFAA SW846-7740  Analyst: A. ROBERTSON Analysis Date: 20-DEC-93 Instrum  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0	BDL	Result	Teet: M1282	Z.O Units mg/L

Lab Sample ID: A297729

MERCURY CVAA SW846- Analyst: G. MAPP Prep: MERCURY CVAA ACID	-7470 Analysis Date: 07-DEC-93 DIGESTION OF AQUEQUS SAMPLES SUSA		Test: M120.1.0
MERCURY	Parameter	Result BDL	Det. Limit Units 0.00050 mg/L

Sample Comments

BDL Below Detection Limit

IDEM Drinking Water Certification Number C-49-01 This Certificate shall not be reproduced, except in full, without the written approval of the lab.

CBBoyle

Service Location	Received	Project	Lab 10
HERITAGE LABORATORIES, INC.	30-NOV-93		A297723
7901 W. MORRIS ST.	Complete	PO Nu	mber
INDIANAPOLIS, IN 46231	22-DEC-93	CI0325	5.001
(317)243-8305	Printed	Sampl	led
	23-DEC-93	29-NOV-9	93 14:40

Report To

GARY CIPRIANO GERAGHTY & MILLER, INC., SUITE 1000 35 E. WACKER DRIVE CHICAGO, IL 60601

Bill To

GARY CIPRIANO GERAGHTY & MILLER, INC., 35 E. WACKER DRIVE CHICAGO, IL 60601

Sample Description

DESCRIPTION: GMMW-3 LOCATION: STACK PROPERTY - NORTH CHICAGO

Analyst: G. Wilson Analysis Date: 08-DEC-93 11:16	instrument:	GC/HS VOA		Test: 05	10.3.0
Parameter		Result	Det.	Limit	Units
ACETONE	BDL			20	ug/L
BENZENE	BDL			5	ug/L
BROMODICHLOROMETHANE	BDL		j	5	ug/L
BROMOFORM	BDL		-	5	ug/L
BROMOMETHANE	BDL			10	ug/L
CARBON DISULFIDE	BDL	* <del>!</del>		5	ug/L
CARBON TETRACHLORIDE	BDL			5	l ua/L
CHLOROBENZENE	BDL	trigita. Santan		5.	ug/L
CHLOROETHANE	BDL		1	10	ug/L
CHLOROFORM	BDL		1	5	ug/L
CHLOROMETHANE	BDL			10	ug/L
DIBROMOCHLOROMETHANE	BDL			5	
CIS-1,3-DICHLOROPROPENE	BDL			5	ug/L
1,1-DICHLOROETHANE	80L			5	ug/L
1,2-DICHLOROETHANE	BDL			5	l ug/L
1,1-DICHLOROETHENE	BDL	•		5	ug/L
1,2-DICHLOROPROPANE	BDL		ł	5	l ug/L
ETHYL BENZENE	BDL	•	1	5	ug/L
2-HEXANONE	BDL		}	10	ug/L
DICHLOROMETHANE (METHYLENE CHLORIDE)	BDL	* # 1 T		5	
METHYL ETHYL KETÖNE	BDL	·		10	ug/L
4-METHYL-2-PENTANONE	BDL				ug/L
STYRENE	BDL		Ī	5	ug/L
1,1,2,2-TETRACHLOROETHANE	BDL				
TETRACHLOROETHENE	BDL		1	5	ug/L
TOLUENE	BDL			5	ug/L
1,2-DICHLOROETHENE (CIS AND TRANS)	17		1	5	ug/L
TRANS-1,3-DICHLOROPROPENE	BDL			5	ug/L
1,1,1-TRICHLOROETHANE	BDL			5	ug/L
1,1,2-TRICHLOROETHANE	BOL			5	
TRICHLOROETHENE	BDL		1	5	ug/L
VINYL ACETATE	BDL	t zwie m			ug/L
VINYL CHLORIDE	13			10	ug/L
XYLENES (O/M/P-XYLENE)	BOL	# 1 · · · · · · · · · · · · · · · · · ·	. •	e e manazione	ug/L

Page 1 (continued on next page)

Parameter

CHROMIUM

Det. Limit

0.010

Result

**BDL** 

Units

ma/L

مراح المراح ا		ran sample in	: MZ3//Z3
COBALT ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test: N	H1.3.0
COBALT Peremeter	Result BDL	Det. Limit 0.010	Units   mg/L
COPPER ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		lestr #	112.3.0
Perameter COPPER	Result BDL	Det. Limit 0.020	units mg/L
IRON ICP SW846-6010A  Analysis Data: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Test: H	15:3.0
Parameter IRON	Result 3.5	Det. Limit 0.025	units mg/L
MAGNESIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Tests #1	18.3.0
Pereneter MAGNESIUM	Result 81.	Det. Limit 0.20	Units Mg/L
MANGANESE ICP SW846-6010A  Analyst: M. JAO  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Tests. W	19,3.0
Peremeter MANGANESE	Result 0.43	Det. Limit 0.010	unite mg/L
NICKEL ICP SW846-6010A  Analyst: H. JAO  Analysts Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A	* * * * * * * * * * * * * * * * * * *	Test: #	1223,0
Parameter NICKEL	Result BOL	Det. Limit 0.010	Units mg/L
POTASSIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test: #	126.3.0
Peremeter POTASSIUM	Result 3.2	Det. Limit 0.20	Units mg/L
SILVER ICP SW846-6010A  Analyst: H. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Jessy: F	190(3.0
Parameter	Result BDL	Det. Limit 0.010	Units mg/L
SILVER			HIM/ L
SILVER  SODIUM ICP SW846-6010A  Analysis Data: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SUB46-3005A	Instrument: ICP	Teatre	13123.0

VANADIUM ICP SW846-6010A			
Analyst: M. JAO Analysis Date: 06-DEC-93"08		Test: #1	38.3.0
Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SUB46-3	005A P130.4.0		
/ANADIUM	Result BDL	Det. Limit 0.010	Units mg/L
INC ICP SW846-6010A Analyst: M. JAG Analysis Date: 06-DEC-93 D8	=	Testa:H1	<b>39.3.</b> 0
Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SUB46-3 Parameter	Result	Det. Limit	Units
INC	BDL	0.020	mg/L
GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW84 Analysis Date: 07-DEC-93	6-3020A	Tests P130.6	1020
Parameter INITIAL WEIGHT OR VOLUME FINAL VOLUME	50 50	Det. Limit	Units ML ML
ARSENIC GFAA SW846-7060 Analyst: N. HEMMERLEIN Analysis Date: 20-DEC-93 Prep: GFAA ACID DIGESTION OF AQUECUS SAMPLES SW846-3020A P	Instrument: GFAA 130.6.0	Test: N103,2	.0
Parameter	Result	Det. Limit	Units
AKSENIC	0.10	0.025	mg/L
ARSENIC 1:5 dilution	0.10	0.025	mg/L
1:5 dilution	Instrument: ICP	Test: H108.0	
2:5 dilution  CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3  Parameter	Instrument: ICP	Test: H108.0	u,0
1:5 dilution  CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3	Instrument: ICP 005A P130.4.0 Result BDL Instrument: ICP	Test: M1D8.0  Det. Limit 0.0010  Test: M116.0	Units mg/L
CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3  Parameter  CADMIUM  LEAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3  Parameter	Instrument: ICP 005A P130.4.0 Result BDL Instrument: ICP	Test: M1D8.0  Det. Limit 0.0010  Test: M116.0	Units mg/L
CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3  Parameter  CADMIUM  LEAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3	Instrument: ICP 005A P130.4.0  Result BDL  Instrument: ICP 005A P130.4.0  Result BDL	Det. Limit 0.0010  Test: M116.0	Units mg/L  Units mg/L
ADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3  Parameter  ADMIUM  EAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3  Parameter  EAD  HALLIUM GFAA SW846-7841  Analyst: A. ROBERTSON Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P  Parameter  HALLIUM	Instrument: ICP 005A P130.4.0  Result BDL  Instrument: ICP 005A P130.4.0  Result BDL	Test: M1D8.0  Det. Limit 0.0010  Test: M116.0  Det. Limit 0.0050	Units mg/L  Units mg/L  Units mg/L
CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3  Parameter  CADMIUM  LEAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3  Parameter  LEAD  THALLIUM GFAA SW846-7841  Analyst: A. ROBERTSON Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A F	Instrument: ICP 005A P130.4.0  Result BDL  Instrument: ICP 005A P130.4.0  Result BDL  Instrument: GFAA P130.6.0  Result BDL	Test: M1D8.0  Det. Limit	Units mg/L  Units mg/L  Units mg/L  Units mg/L

Lab Sample ID: A297723

MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-7470 Analyst: G. MAPP Analysis Date: 01-DEC-93 Test: P131-6.0					
Parameter	Result	Det. Limit	Units		
INITIAL WEIGHT OR VOLUME	100	i i	mL		
FINAL VOLUME	100	The state of the s	mL.		

MERCURY CVAA SW846-7470		
Analysis Date: 07-DE Prep: MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMPLE	·	Test: #120;3,6
Perameter	Result	Det. Limit Units
MERCURY	BDL	0.00050 mg/L

Sample Comments

BDL Below Detection Limit

Quality Assurance Officer:

IDEM Drinking Water Certification Number C-49-01 This Certificate shall not be reproduced, except in full, without the written approval of the lab.

CBBoyce

Service Location HERITAGE LABORATORIES, INC. 7901 W. MORRIS ST. INDIANAPOLIS, IN 46231 (317)243-8305	Received 30-NOV-93	Lab 10 A297728	
	Complete 22-DEC-93	PO N C I 032	5.001
	Printed	Samp	led
	23-DEC-93	29-NOV-	93 11:20

Report To

GARY CIPRIANO GERAGHTY & MILLER, INC., SUITE 1000 35 E. WACKER DRIVE CHICAGO, IL 60601

Bill To

GARY CIPRIANO GERAGHTY & MILLER, INC., 35 E. WACKER DRIVE CHICAGO, IL 60601

Sample Description

DESCRIPTION: RINSE BLANK LOCATION: STACK PROPERTY - NORTH CHICAGO

Analyst: G. WILSON Analysis Date: 08-DEC-93 15:1	8 Instrument:	GC/HS VOA	Test: 0	510.3.0
Parameter		Result	Det. Limit	Units
ACETONE	BDL		20	ug/L
BENZENE	BDL		5::	ug/L
BROMODICHLOROMETHANE	BDL		5	ug/L
BROMOFORM	BDL	****	5	1 .
BROMOMETHANE	BDL		10	ug/L
CARBON DISULFIDE	BDL		5.	ug/L
CARBON TETRACHLORIDE	BDL		5	ug/L
CHLOROBENZENE	BDL		5	ug/L
CHLOROETHANE	BDL		10	ug/L
CHLOROFORM	BDL		5.5	ug/L
CHLOROMETHANE	BDL		10	ug/L
DIBROMOCHLOROMETHANE	BDL		5	ug/L
CIS-1,3-DICHLOROPROPENE	BDL		5	ug/L
1,1-DICHLOROETHANE	BDL		5.0	ug/L
1,2-DICHLOROETHANE	BDL		5	ug/L
1,1-DICHLOROETHENE	BDL		5	ug/L
1,2-DICHLOROPROPANE	BDL		5	ug/L
ETHYL BENZENE	BDL		5:::	1 -3/ -
2-HEXANONE	BDL		10	ug/L
DICHLOROMETHANE (METHYLENE CHLORIDE)	BDL		5.775	
METHYL ETHYL KETONE	BDL		10	: •
4-METHYL-2-PENTANONE	BDL		10	, , , , , , , , , , , , , , , , , , , ,
STYRENE	BDL		5	ug/L
1,1,2,2-TETRACHLOROETHANE	BDL	4,5 5 a.u a - a - a - a - a - a - a - a - a -	5	
TETRACHLOROETHENE	BDL		5	ug/L
IULUENE	RUL		5	ug/L
1,2-DICHLOROETHENE (CIS AND TRANS)	BDL		5	ug/L
TRANS-1,3-DICHLOROPROPENE	BDL		5	
1,1,1-TRICHLOROETHANE	BDL		5	ug/L
	BDL		5	ug/L
TRICHLOROETHENE	BDL		5	ug/L
VINYL ACETATE	BDL		10	ug/L
VINYL CHLORIDE	BDL		10	ug/L
XYLENES (O/M/P-XYLENE)	BDL		5.	ug/L

1 (continued on next page) Page

HERITAGE LABORATORIES, INC.		Lab Sample ID: A297728
Parameter	Result	Det. Limit Units
SURROGATE RECOVERY		A #8 ( N. A)
DICHLOROETHANE-D4 TOLUENE-D8 4-BROMOFLUOROBENZENE	106 99 107	% Rec % Rec % Rec
FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW Analyst: E. MERRILL Analysis Date: 02-DEC-93	1846-3005A	Test: P130.4.0
Permeter INITIAL WEIGHT OR VOLUME FINAL VOLUME	Result 50 50	Det. Limit Units mL
ALUMINUM ICP SW846-6010A Analyst: M. JAG Analysis Date: 06-DEC-93 D8:00 1 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A 1	1,000	Test: #101,3.0
Peremeter ALUMINUM	Result BDL	Det. Limit Units 0.050 mg/L
ANTIMONY ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 I  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A I		Test: N102.3.0
Parameter ANTIMONY	Result BDL	Det. Limit Units 0.030 mg/L
BARIUM ICP SW846-6010A Analyst: M. JAQ Analysis Date: 06-DEC-93 08:00 1 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A 1		Yest3: #104;3.0
Parameter BARIUM	Result BDL	Det. Limit Units 0.010 mg/L
BERYLLIUM ICP SW846-6010A  Analyst: M. JAD Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEQUS SAMPLES SW846-3005A		Test: #105,3.0
Parameter BERYLLIUM	Result BDL	Det. Limit Units 0.0050 mg/L
BORON ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test::#107:3.0
Parameter BORON	Result 0.084	Det. Limit Units 0.050 mg/L
CALCIUM ICP SW846-6010A  Analyst: M. JAO  Analysis Date: 06-DEC-93 D8:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Teatr: N109:3.0
Parameter CALCIUM	Result BDL	Det. Limit Units 0.20 mg/L
CHROMIUM ICP SW846-6010A  Analyst: M. JAD Analysis Date: 06-DEC-93-08:00 Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A	**************************************	Teety: #19-3.0
Parameter CHROMIUM	Result BDL	Det. Limit Units 0.010 mg/L

SODIUM ICP SW846-6010A  Analyst: M. JAO Analysis Osto: 06-DEC-93 08:00 fres  Prop: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES \$4846-3005A 9130	5	let: N	31:3.0
Perameter	Result	Det. Limit	units
SODIUM	BDL	0.20	mg/L

THALLIUM GFAA SW846-7841 Analyst: A. ROBERTSON Analysis Date: 12-DEC-93 Instrument: GFAA Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P130.6.0		Tests N13422.0:80		
Parameter THALLIUM	Result BDL	Det. Limit 0.020	units mg/L	
1:4 DILUTION				

SELENIUM GFAA SW846-7740 Analyst: A. ROBERTSON Analysis Date: 20-DEC-93   Instrum Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES \$4846-3020A P130:6.0	mt: GFAA	Toat: N128;2.025.
Parameter	Regult	Det. Limit Units
SELENIUM	BDL	0.0050   mg/L

MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMPLES SW Analysis C. MAPP Analysis Date: 01-DEC-93	846-7470	Test: P1512	13.5
Parameter	Result	Det. Limit	Units
INITIAL WEIGHT OR VOLUME FINAL VOLUME	100   100		

Lab Sample ID: A297728

MERCURY CVAA SW846~7470 Analyst: G. MAPP Analysis Date: 07-DEC-93 Instrument: CVAA Test: M120.1.0 Prep: MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-7470 P131.6.0					
MERCURY	Parameter	Result BDL	Det. Limit Units 0.00050 mg/L		

Sample Comments

BDL Below Detection Limit

IDEM Drinking Water Certification Number C-49-01 This Certificate shall not be reproduced, except in full, without the written approval of the lab.

Service Location HERITAGE LABORATORIES, INC. 7901 W. MORRIS ST. INDIANAPOLIS, IN 46231 (317)243-8305	Received Project 30-NOV-93 A		Leb 10 A297724
	Complete 22-DEC-93	=	
	Printed 23-DEC-93	29-NOV-	93 07:30

Report To

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
SUITE 1000
35 E. WACKER DRIVE
CHICAGO, IL 60601

Bill To

GARY CIPRIANO
GERAGHTY & MILLER, INC.,
35 E. WACKER DRIVE
CHICAGO, IL 60601

Sample Description

DESCRIPTION: GMMW-4

LOCATION: STACK PROPERTY - NORTH CHICAGO

VOLATILE ORGANICS SW846-8240A Analyst: G. WILSON Analysis Date: 08-DEC-93 12:04 Instrument: GC/MS-VOA					Test: 0518:3.0		
Parameter		Result	Det.	Limit	Units		
ACETONE	BDL			20	ug/L		
BENZENE	BDL	to the many property of the contract of the co	<u> </u>	55	ug/L		
BROMODICHLOROMETHANE	BDL		ł	5	ug/L		
BROMOFORM	BOL	e de la compania de La compania de la co		5			
BROMOMETHANE	BDL		]	10	ug/L		
CARBON DISULFIDE	BDL	7		5	ug/L		
CARBON TETRACHLORIDE	BDL			5	ug/L		
CHLOROBENZENE	BDL		İ	5	ug/L		
CHLOROETHANE	BDL		]	10	ug/L		
CHLOROFORM	BDL	. • •			ug/L		
CHLOROMETHANE	BDL	•		10	ug/L		
DIBROMOCHLOROMETHANE	BDL		1	5	ug/L		
CIS-1,3-DICHLOROPROPENE	BDL			5	ug/L		
1,1-DICHLOROETHANE	BDL			5	ug/L		
1,2-DICHLOROETHANE	BDL			5	ug/L		
1,1-DICHLOROETHENE	BDL	•		5	ug/L		
1,2-DICHLOROPROPANE	BDL			5	ug/L		
ETHYL BENZENE	BDL		ŧ	5	ug/L		
2-HEXANONE	BDL		1	10	ug/L		
DICHLOROMETHANE (METHYLENE CHLORIDE)	BDL			5	ug/L		
METHYL ETHYL KETONE	BDL		1	10	ug/L		
4-METHYL-2-PENTANONE	BDL		4	10	ug/L		
STYRENE	BDL			5	ug/L		
1,1,2,2-TETRACHLOROETHANE	BDL			5.	ug/L		
TETRACHLOROETHENE	BDL		ĺ	<b>5</b> °	ug/L		
TOLUENE	BDL				ug/L		
1,2-DICHLOROETHENE (CIS AND TRANS)	17		l	5	ug/L		
TRANS-1,3-DICHLOROPROPENE	BDL				ug/L		
1,1,1-TRICHLOROETHANE	BDL		}	5	l ug/L		
1,1,2-TRICHLOROETHANE	BDL				ng/L		
TRICHLOROETHENE	BDL			5			
VINYL ACETATE	BDL				ug/L		
VINYL CHLORIDE	14			10.	ug/L		
XYLENES (O/M/P-XYLENE)	BDL		7	5	Ng/L		

Page 1 (continued on next page)

Parameter SURROGATE RECOVERY DICHLOROETHANE-D4	Result	Det. Limit	Units
SURROGATE RECOVERY			l .
DICHI OROFTHANE_DA	1	1.11	Time of the second
TOLUENE-D8 4-BROMOFLUOROBENZENE	95 100 101		% Rec % Rec % Rec
FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES S Analyst: E. MERRILL Analysis Date: 02-DEC-93	W846-3005A	Yest: <b>?</b> 130,	1.0
Parameter INITIAL WEIGHT OR VOLUME FINAL VOLUME	50 50	Det. Limit	Units mL mL
ALUMINUM ICP SW846-6010A  Analyst: M. JAO  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Testr	1013.0
Parameter ALUMINUM	Result BDL	Det. Limit 0.050	Units mg/L
ANTIMONY ICP SW846-6010A  Analyst: M. JAO  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Test::N	102.3.0
Parameter	Result BDL	Det. Limit 0.030	Units mg/L
BARIUM ICP SW846-6010A  Analyst: M. JAG Analysis Date: 06-0EC-93:08:00 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Tests N	104.3.0
Parameter BARIUM	Result 0.15	0.010	Units MQ/L
BERYLLIUM ICP SW846-6010A Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Prep: FAA OR ICP ACID DIGESTION OF AGUEGUS SAMPLES SW846-3005A		•	105.3.0
Parameter BERYLLIUM	Result BDL	Det. Limit 0.0050	Units mg/L
BORON ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Testa: I	1107.3.0
BORON	Result	Det. Limit 0.050	Units Ing/L
CALCIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005A		Tosts.)	1107,3.,0
CALCIUM Parameter	Result 160	Det. Limit 0.20	units mg/L
CHROMIUM ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Teits	r)10:3,0
Parameter CHROMIUM	Result BDL	Det. Limit 0.010	Units mg/L

HERITAGE LABORATORIES, INC.		Lab Sample ID: A297724
COBALT ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Teats: N111,3.0
COBALT	Result BDL	Det. Limit Units 0.010 mg/L
COPPER ICP SW846-6010A  Analyst: M. JAG Analysis Date: 06-DEC-93 08:00  Prep: FAA OR 1CP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Teen: #112.3.8
COPPER	Result BDL	Det. Limit Units 0.020 mg/L
IRON ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prop: FAA OR ICP ACID DIGESTION OF AQUECUS SAMPLES SW846-3005A	1.00	Test#: #11535.0
Parameter IRON	Result 2.8	Det. Limit Units 0.025 mg/L
MAGNESIUM ICP SW846-6010A  Analyst: M. JAG Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005A		Test::#118.3.5
Parameter MAGNESIUM	Result 84.	Det. Limit Units 0.20 mg/L
MANGANESE ICP SW846-6010A Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Prep: FAA OR ICP ACID DIGESTION OF AGUECUS SAMPLES SW846-3005/	5000	Tent: #119.3.0
Parameter MANGANESE	Result 0.44	Det. Limit Units 0.010 mg/L
NICKEL ICP SW846-6010A  Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005)		Test: #122.3.8
Parameter NICKEL	Result BDL	Det. Limit Units 0.010 mg/L
POTASSIUM ICP SW846-6010A Analyst: M. JAO Analysis Date: 06-DEC-93 08:00 Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-3005/	· ·	Test: 9136.3.0
Poremeter POTASSIUM	Result 3.2	Det. Limit Units 0.20 mg/L
SILVER ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-3005	1. 3. Viv	Tests (1993.5
Parameter SILVER	Result BDL	Det. Limit Units 0.010 mg/L
SODIUM ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:00  Prop: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SU846-3005.		Teste:MSL3.0

ANADIUM ICP SW846-6010A  Analyst: H. JAG Analysis Date: 06-DEC:93 D8:0  Prep: FAA OR ICP ACID DIGESTION OF AGUEOUS SAMPLES SW846-300		Tentr M	38.3.0
Parameter  ANADIUM	Result BDL	Det. Limit 0.010	Units mg/L
INC ICP SW846-6010A  Analyst: M. JAO Analysis Date: 06-DEC-93 08:0  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-300		Tests N	139.3.0
INC Parameter	Result BDL	Det. Limit 0.020	units mg/L
FAA ACID DIGESTION OF AQUEOUS SAMPLES SW846 Analysis Date: 07-DEC-93	-3020A	Test: 71302	
Parameter NITIAL WEIGHT OR VOLUME INAL VOLUME	Result 50 50	Det. Limit	Units mL mL
RSENIC GFAA SW846-7060 Analyst: N. HEMMERLEIN Analysis Date: 20-DEC-93   Prep: GFAA ACID DIGESTION OF AGUEOUS SAMPLES SW846-3020A P1	Instruments GFAA 30.6.0	Test2 H103.	and the second of the second of the
Parameter	Result	Det. Limit	Units
RSENIC	0.092	0.025	
ARSENIC 1:5 dilution			mg/L
ARSENIC 1:5 dilution	0.092	0.025	mg/L
RSENIC  25 dilution  ADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter	0.092	0.025	mg/L 0,5 3 Units
ARSENIC  2:5 dilution  CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysts Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter  CADMIUM	0.092  Instrument: ICP 05A P130.4.0  Result BDL	0.025 Tests #108,	mg/L 0.5 Units mg/L
RSENIC :5 dilution  ADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter  ADMIUM  EAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter	0.092  Instrument: ICP 05A P130.4.0  Result BDL	7est: N108, Det. Limit 0.0010	mg/L  O.5 :  Units  mg/L  O.0:
CADMIUM TRACE ICP SW846-6010A Analyst: J. WALLACE Analysis Date: 21-DEC-93 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30 Parameter CADMIUM  EAD TRACE ICP SW846-6010A Analyst: J. WALLACE Analysis Date: 21-DEC-93 Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30 Parameter  LEAD  THALLIUM GFAA SW846-7841	O.092  Instrument: ICP 05A P130.4.0  Result BDL  Instrument: ICP 05A P130.4.0  Result BDL	0.025 Test: M108.  Det. Limit 0.0010 Test: M116.	mg/L  O.S.  Units mg/L  O.D.  Units mg/L
RSENIC  2.5 dilution  CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter  CADMIUM  EAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter  EAD  FAALLIUM GFAA SW846-7841  Analyst: A. ROBERTSON Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P1  Parameter  THALLIUM	O.092  Instrument: ICP 05A P130.4.0  Result BDL  Instrument: ICP 05A P130.4.0  Result BDL	Tests N108,  Det. Limit 0.0010  Test: M118.	mg/L  0.5 Units mg/L  Units mg/L  2.0
ARSENIC  1:5 dilution  CADMIUM TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter  CADMIUM  LEAD TRACE ICP SW846-6010A  Analyst: J. WALLACE Analysis Date: 21-DEC-93  Prep: FAA OR ICP ACID DIGESTION OF AQUEOUS SAMPLES SW846-30  Parameter  LEAD  THALLIUM GFAA SW846-7841  Analyst: A. ROBERTSON Analysis Date: 12-DEC-93  Prep: GFAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-3020A P1	Instrument: ICP 05A P130.4.0  Result BDL  Instrument: ICP 05A P130.4.0  Result BDL  Instrument: GFAA 130.6.0  Result BDL	Det. Limit   0.0010   Test: M16.   Det. Limit   0.0050   Test: M154.   Det. Limit   mg/L  0.5 3  Units mg/L  Units mg/L  2.0	

Lab Sample ID: A297724

MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMPLES SW846-7470 Analyst: G. MAPP Analysis Date: 01-DEC-93 Test: P133:8.8.**				<b>6.0</b> . <i>m</i> a
INITIAL WEIGHT OR VOLU	nrameter ME	Result 100		Units mL
FINAL VOLUME	MF.			

MERCURY CVAA SW846-7470  Analyst: G. MAPP  Analysis Date: 07-DEC-5  Prep: MERCURY CVAA ACID DIGESTION OF AQUEOUS SAMPLES	- 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Test: #120;	
Parameter	Result	Det. Limit	Units
MERCURY	BDL	0.00050	mq/L

Sample Comments

BDL Below Detection Limit

IDEM Drinking Water Certification Number C-49-01 This Certificate shall not be reproduced, except in full, without the written approval of the lab.

Quality Assurance Officer: \_\_\_\_\_\_\_ CBBowl

Page 5 (last page)